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ABSTRACT

Topics of general interest in park and recreation management and programming are discussed. This issue deals with energy/environmental education in parks. Various professionals in the fields of park and recreation, education, conservation, energy, historic preservation, and government have contributed articles. Some describe ongoing programs and projects, while others suggest future directions for energy and environmental education. Both the natural and the built environments, with an emphasis on man's impact and interrelationship to each, are discussed. A bibliography of books and reports is included along with a list of federal agencies and private organizations to contact for publications and assistance. (TM)

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Trends

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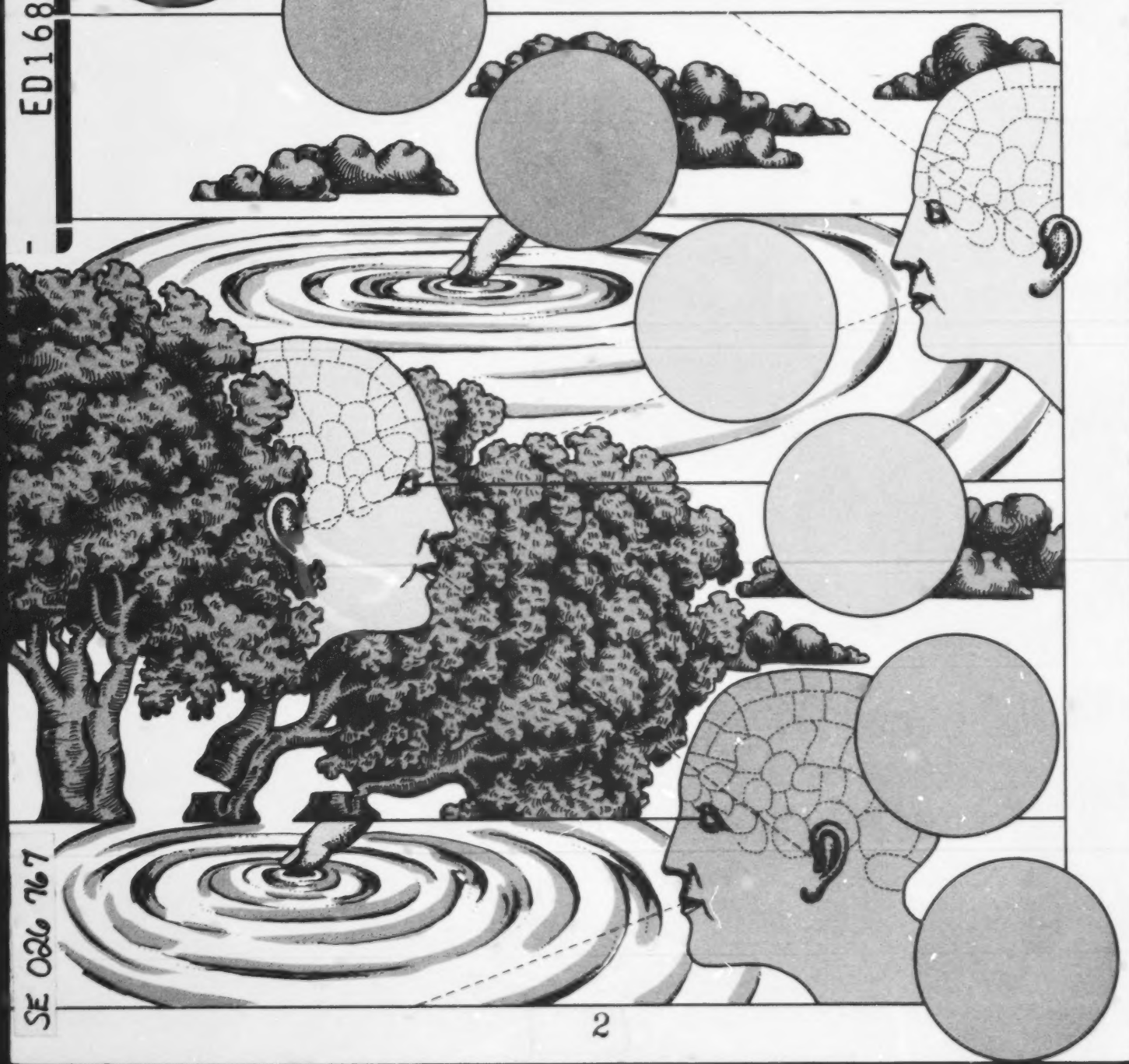

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National Park Service

Parks provide the ideal setting for educating the public about man's interrelationship with his environment.

Introduction

by Robert L. Herbst

Environmental education is no longer a frill or a luxury. It is an essential management function for every park, recreation area, and refuge to undertake—just like migratory birds and endangered species.

It was back in 1968, when I joined forces with other concerned environmentalists in Minnesota and prepared an Environmental Education Act. That act passed the 1969 legislature and became a model for many other states. It also set *me* firmly on the road to greater understanding of man's relationship to Earth as a whole—and helped me define my life's commitment.

The great natural systems of Earth are what grew us—you and me and every member of the human species. We may isolate ourselves in air-conditioned homes and float from place to place in steel-and-chromium wombs that gobble fossil fuels, but all these buffers between ourselves and "nature" are totally dependent on nature's continued largesse. Environmental education is the realization that this is so.

Environment and energy are the context within which the entire world and all its sets of subsystems operate. Environment is the setting, the component parts. Energy is what makes the setting move. There is only so much. We can take it apart and put it together in as many ways as our ingenuity can devise, so long as there is energy to power the movement.

We have moved at the Secretarial level of the Interior to tie energy and environmental education into one package. I have a task force of my own that is intent on furnishing all three of my agencies—the National Park Service, Heritage Conservation and Recreation Service, and Fish and Wildlife Service—with the very best materials and activities it can find or devise.

Someone once described a school as a "building within four walls and the future inside." If the future is to be worth the effort it will take to get there, then some of what is outside those walls must find its way inside. Hence the logical partnership between the education and park communities where environmental education is concerned.

We are launching an intensive environmental education program at the Department of the Interior, with the great national parks leading the way—calling attention to the beauty and harmony and quality that results when a system reaches a balanced or steady state. Parks, recreation areas, and refuges are among the most superb settings that exist for bringing the environmental IQ of this nation up to the task at hand.

Our environmental education program is going to become something we *all* can learn from. It will be part and parcel of our planning, our management, our maintenance, *and* our interpretation. We will tend our own house as carefully as we ask others to tend theirs. We cannot do less and retain credibility. The best education is experiential, and we hope to frame our environmental education efforts in a way that Interior's management will set an example for America and provide a showcase for enlightened leadership.

In this issue of TRENDS, you will share energy and environmental education perspectives of professionals in the fields of park and recreation, education, conservation, energy, historic preservation, and government. Some articles will inform you of interesting programs and approaches now being tried. Others will suggest future directions for effective energy and environmental education. Many will emphasize the role of park settings and park agency cooperation with other environmental educators in meeting the challenges we share. A number of our authors touch upon a recurring theme: the pressing need for all concerned groups to work cooperatively toward the sound environmental education of the American public. Let every park and recreation professional do his or her best to respond to this need. For environmental education just may be man's best hope at this time.

Robert L. Herbst is Assistant Secretary of the Department of the Interior for Fish and Wildlife and Parks.

Roundtable Discussion: Energy/Environmental Education in Our National Parks

Fred Bell, National Park Service

U.S. Department of the Interior officials lay out plans for a new Energy/Environmental Education thrust in national parks. Seated, left to right, are: Environmental Education Specialist Barbara Clark, Departmental Environmental Education Steering Committee Chairperson Hope Moore, Assistant Secretary Robert L. Herbst, National Park Service Director William J. Whalen, and Deputy Assistant Secretary Richard Myshak.

Editor's Note: On two occasions last Fall, September 12 and 18, energy/environmental education in the national parks was the subject of discussion by Assistant Secretary of the Interior Robert L. Herbst and the staff he has named to lead this action: Deputy Assistant Secretary Richard Myshak, National Park Service Director William J. Whalen, Environmental Education Specialist Barbara Clark, and Departmental Environmental Education Steering Committee Chairperson Hope Moore. Following are excerpts from those two sessions—edited by Jean Matthews, a National Park Service Energy Specialist—setting out guidelines for National Park Service personnel and indicating some ways to proceed.

Secretary Herbst: The artillery present here certainly represents all the major fire power. Out of this discussion should come two clear messages—*expectations* and *support!*

Recently I flew out to the Albright Training Center at Grand Canyon to help open the National Park Service's first energy/management conference. The emphasis there was on understanding the basic nature of energy conservation—how to avoid using the fuels we have to pay for, and how most efficiently to use the fuels we do purchase.

I was impressed with the organization and effort that had gone into presenting a complex and difficult subject. I was even more impressed with the possibilities on down the line, as everyone pitches in. And I was struck with the tremendous opportunity this energy challenge gives us, to do a really bang-up job of environmental education in our park areas.

The fact is that energy is the perfect thread for tying everything together—the running of the natural systems of the parks, the fueling of the human overlays where we handle management and safety and interpretation for the visitors—and the so-called "reward loops" that keep the bears and blackberries and superintendents and concessionaires happy in their separate niches.

The message at the Grand Canyon workshop was that energy costs will continue to escalate, and that smart management is more and more going to be smart *energy* management.

Think of the environmental education potential in that fact. I'm talking now about the education of park personnel! If charity begins at home, education would do well to follow suit. One of the first EE lessons park managers should learn is that every penny saved by NOT purchasing gasoline, oil, and electricity is a penny that can be used instead on programs and personnel. And by the same token, the extra dollars that go to keep up our energy "habit" will have to come out of other columns in our park budgets.

The need to conserve purchased energy throws park management into the environmental education picture at the direct action level. Where can you cut your energy budgets and get a free ride on the natural systems of your area?

And once you have answered that question, how much mileage can you get out of sharing your solution with park visitors? Think how much *they* can learn about how systems work as they absorb the meaning of the energy-efficient measures you have so cleverly taken.

Passive Solar Design

Take "passive solar design" for instance. It sounds like something that would require a degree in architecture to perform. Actually, it means such things as using windows and skylights instead of electric lights; of using cross ventilation and the micro-climate furnished by trees and water near buildings instead of air conditioning; the use, where possible, of natural systems/digestion instead of tertiary sewage treatment.

Passive solar design is a matter of common sense; the rewards are a matter of dollars and cents.

The fact is we DO have to economize; we have to trim our fat energy budgets and re-think, perhaps even cut back on some of our former programs. But the opportunities for learning are at least as enormous as the management problems posed. It helps to have an understanding of the laws of nature—how energy moves through systems and how systems self-design around these energy flows.

Possibly in no other terms than those of energy can we begin to understand the profound changes we are facing. It won't just *BE* a different world—it already *IS!*

The national parks have done a superb job of management and interpretation in the past, but the past is past. Today the Park Service has a responsibility to contemporize its operations in the light of emerging new national needs.

I have been committed to strong environmental education programs ever since the mid-60s, and I am well aware that there are places in the National Park System where this opportunity has been used well. But current events call for intensified effort.

Bill Whalen, Secretary Andrus, President Carter—each of us has made his commitment in the manner appropriate to his level of responsibility; now it's time for the troops to take to the field. Every one of us here in this room concurs with this action.

For more than a century, Americans have simply "basked" in the beauty and grandeur and significance of the National Park System. Today every American is being asked to look below the surfaces—to find out how things work and to make better, more efficient use of the marvels we can no longer afford to take for granted.

Parks Must Be Models of Excellence

The parks of our great national system have an additional responsibility to themselves, if you want to look at it that

way. They can serve as examples of excellence in energy/environmental management, and they can further serve as transmitters of this excellence to those who visit the sites.

I want to hear now from Bill Whalen as to how the plans are shaping up at the trainee and at the implementation levels. I understand we're well on the way to complying with the President's and the Secretary's wishes in this regard.

Director Whalen: Well Bob, one very significant plus the Park Service has going for it is the basic "caring" attitude of our visitors for their surroundings. We see this program as a concerted effort for intensifying this attitude. We want to pick up on visitors in the park surroundings and then give them something they can use when they go back home.

Parks as Backdrops for EE

The parks themselves serve as the inspirational backdrops, if you will, to develop this sort of approach. For example, in Yosemite (CA), the Grand Canyon (AZ), and Mt. McKinley(AK), we have transportation systems that take people to and from the various interest sites within the park, saving quantities of fuel in the process. Now a proper interpretation of those practices highlights the energy dimension of what we are doing. We call attention to the measures that are working for us all here in the park, and we ask, "What about your own neighborhoods at home? Have you thought about pushing for better forms of transportation at your local level?"

The backdrop of the park for various environmental education programs can be made available to school groups, such as we do at the Catoctin Mountain Park (MD), where the cities of Washington, DC and Baltimore can take children on a recurring basis to learn about conservation.

Out in San Francisco, I had the privilege of starting many programs where the school systems of the East Bay and the city of San Francisco could use the buildings and the resources of the park.

Systems Management

But I think that beyond the use of park buildings by school systems lies another point that has to be made. We in the Park Service are working towards getting our own house in order . . . working diligently to implement programs—not only design and construction, but *operational* programs—that make our buildings as energy efficient as possible.

You were part of the program at its kick-off, Bob, and I want you to know that we are going to follow up with regional seminars and meetings to get this message on out to the people on the front lines—the ones who will actually be meeting and greeting the visitors and selling this great story.

We feel very proud that the national parks have such an important role in carrying out the President's energy program for America. We can present the whole idea of wise energy use to more than 200 million visitors every year.

I'd like to ask Barbara Clark to speak to some of the specifics. Barbara, we're glad to have you on board. Barbara comes to us from Minnesota, where she has already had a great career in the field of environmental education. She has been working closely with our people since July and she will talk a little now about the specifics of the program.

Environmental Education Specialist Clark: Thank you, Bill. One of the critical things both you and Assistant Secretary Herbst touched on is the management message the Park Service has to share with the public. As you noted, we have long extolled the virtues and aesthetics—the neat landscapes that are part of our parks, but what we would like to say now to our visitors is,"Yes, we have these unique landscapes—these incredibly scenic views; we have the kind of sites that inspire people. But we also need your understanding support to keep these things this way, now and for all time."

We are doing our part by employing contemporary management procedures and processes that are stemming in part from a disciplined science program in the parks. But environmental education is an additional new tool and it encompasses a number of functions. It is part of what we say at the visitor centers; it is part of the general overall attitude we all have toward the visitor. It is implicit in the

Our parks must serve as inspirational backdrops and as examples of excellence in energy/environmental management.

way we share the park in terms of its features and in terms of how we manage it as a system.

Energy Education

An important part of the environmental education program is the energy education program. These two concerns—environment and energy—have engaged the attention of the Park Service at roughly the same time. We are taking a new look at environmental education and the way it can *help* a park—the way it can help get the environmental quality message over to people by, in a sense, tacking it to the coattails of the energy crisis.

The Park Service has recognized the importance of the energy program and the priority given it by the President and the Secretary, and has responded with its own program, one that I believe is far and away more advanced than that of any other land management agency today. My concern about this is that we prove capable of translating what the park is doing in terms of its own energy management into something a visitor can see and understand.

Personnel Training

In order to be able to deliver this kind of program to visitors, we have to begin training our interpreters. To this end we have put together a training program that will be starting right after the first of the year, for all key park interpreters, for superintendents, and for regional directors.

The program will emphasize the technological aspects of the management program and will assist personnel in making these applications evident to the public. Hopefully, these programs will begin to show up strongly in next summer's interpretive efforts.

Essentially, then, that's a thumbnail sketch of energy/environmental

National Park Service

interpretation—a highly visible showcasing of the energetic and environmental processes of running a park site. We are starting with an intensive evaluation of what is already in place . . . of our Service mission and goals, and how an energy/environmental education program can help facilitate the achievement of those goals. We certainly don't want to discard anything that is in place and working well. But there may be some other things we can do, and we'll find that out.

Secretary Herbst: I'd like to hear from my Deputy, Dick Myshak at this point. Dick, could you comment on the difference between environmental education and interpretation. I know that some of the park superintendents I have talked with have said,"Well aren't we doing that with our interpretive programs now?" Maybe you could describe what environmental education is and how energy conservation ties in with it.

Deputy Assistant Secretary Myshak: You're asking for an hour's dissertation, Bob. Let me just back off a bit and pick up on a couple of things I've heard so far.

Bob, you called for an awareness on the part of the public and an understanding of just what it is that we do, as managers. You also called for training our personnel so that they can become educators at the same time they are doing their managing jobs. You also talked about the gains to the Park System when the visitor really gets the message and takes it home with him.

And Barbara, you just referred to starting with training the higher echelons in the Park Service—a very important consideration if commitment is to be sensed as originating and coming down from the top.

The term environmental education raises a host of questions because the simplest definition is that it is a *process*—a process of *doing*. Is "interpretation" environmental education? Yes, it is. Is "publication" environmental education? Yes, it is. So is working with the news media, and on and on. All these things carry the message. They create an awareness and an understanding on the part of the public of what it is that we are doing.

Resource Managers Are Educators

I think equally important is the fact that we who are the resource managers understand that we ARE educators. I want to just dwell on that for a minute.

We consistently work with all sorts of organizations and individuals, trying to get them to understand what we are doing so that we have their support . . . so that we can manage our park system better. We may need to acquire lands or we may need new legislation the better to manage those lands. Whatever it is, if the public doesn't understand the basic nature of what it is we're doing, then it cannot become our advocate when we have to go the legislative route.

If the public does understand and approve of what we are doing, then we have the best of allies—200 million people, working with us to get what it takes to keep the system going.

Equally important, I think, is the necessity that each of us comes to understand: *we are environmental educators!* We're not just wildlife biologists; we're not just park rangers or energy coordinators or whatever. We are all educators, and as such we need to be sharply aware of our dealings with the public. A ranger may think, "My role is to see that the parks are properly patrolled and that's all." But thousands of people a year stop park rangers and ask questions. The way the ranger responds is very important. A refuge manager may think his job is just to watch out for the ducks and geese and other animals that use the refuge. Yet he, too, comes into daily contact with hunters and visitors, and the manager is a living, acting message to the public.

It's through these types of contacts that the public senses what it is we're doing; and if it understands that what we're doing is important, then it will support us. We've got to give our visitors a message to take back, whether it's a message they can practice from a conservation ethics standpoint or whether it's an action on behalf of parks in the state legislature or the city hall or the national Congress.

Secretary Herbst: You're so right, Dick, about our actions speaking at least as loud as our words. In order to speak with one voice, we have formed a Task Force to develop an overall policy for coordinating environmental education throughout Interior. Hope Moore, who is also my special assistant, serves as chairperson of this group. We'd like to hear from you, now, Hope.

Departmental EE Steering Committee Chairperson Moore: I just want to emphasize the strong, basic commitment of top management to environmental education, Bob. As I understand it, there was a great beginning to this movement some ten years ago, after which the whole effort sank into relative obscurity with the notable exception of some bright programmatic spots throughout the National Park System.

The emerging energy crisis has breathed new life into the movement—making energy and environmental education complementary programs of such mutually reinforcing importance as to demand that EE be given line item status in the NPS budget. I strongly support this way to go, and I can underline the high priority this activity holds on the part of the Carter Administration.

Director Whalen: I would like to add that 1979 is going to be known in the National Park Service as "the year of the visitor." We expect to become recognized nationwide as "the hosts of America."

It's a program that the Office of Management and Budget will love, because essentially it only costs a smile. But energy and environmental education are going to be the substance behind that smile. We'll be dispensing all the information and demonstrating all the energy and environmental know-how we possess—to do the best management and interpretive job possible and to infuse others with a resolve to do likewise, wherever they go from the parks.

Is Environmental Education for People . . . Or for the Birds?

by Rudy Schafer

"I have some good news and bad news for you," one of my staff members announced, in presenting the results of a just-completed survey to determine the effectiveness of our statewide Environmental Education Grant program. The good news was that through our 32 funded projects we had directly benefitted 200,000 youngsters in California schools over the past 18 months! Wonderful! What could the bad news be? "Well, Rudy, you have to remember that there are four and a half million kids in California elementary and secondary schools." Precisely.

Environmental education? I have trouble with that phrase as a means of describing what I and others are trying to do. I am concerned with helping youngsters develop the attitudes, knowledge, and skills which they must have if they are to learn to live in harmony with a limited ecosystem and to solve some of the problems which result from our environmental management—or mismanagement. Such programs involve a wide variety of skills and subject matter areas—science, technology, economics, politics, ethics, and values. Good programs permeate the curriculum at every level and have as their basic purpose, making life better for everyone.

Is this the picture you get from the phrase, environmental education? If you are one of the EE professionals, the answer might be "yes," but for most people, it is one of those vague terms which can mean anything and everything to anyone or everyone.

Inadequate Terminology

Some relate the term to environmentalists, whom they see as bearded, barefoot obstructionists who want to take us all back to the stone age. To others, the picture is nature freaks, whale watchers, or tweetie birders. And, to some—and this hurts—we're "jivin' honkies" who want to keep minority people in their place. The Federal EE Act of 1970 has a good definition of environmental education, but, unfortunately, no one seems to have read it. It is pretty tough when you have to start every discussion by telling people what you are—and, more importantly, what you are *not*.

How did we get stuck with an admittedly inadequate term? Back in the early 70s, the Environmental Education Act was passed and a bureaucratic empire created which pushed the term as a means of establishing turf. "Don't come to us with conservation education, outdoor education, nature study, or anything like that," proclaimed the ruling gurus of the time, "we want to hear the term environmental education if you expect to participate in our programs." Prior to that, many of us called ourselves Conservation Educators and taught an ethic—wise use of natural resources for the benefit of people. True, we stressed economic values and some of us did not have the holistic view which came later, but we did have wide acceptability and a tradition going back to the days of Theodore Roosevelt, Gifford Pinchot, and beyond. Did we lose some of that when we changed our terms?

In my opinion we did. Clearly, the term environmental education does not communicate to a broad public and professional constituency what we're all about, and for that reason we haven't had the broad impact we need to be successful.

Widespread Indifference

Despite our best efforts, the "good life" to most Americans still means unlimited consumption whatever the environmental consequences, and let's not worry too much about tomorrow. After all, science, the government, or someone will find the answers. Haven't they always?

Despite the need to change such attitudes, the education community doesn't see environmental education as being very important. California education administrators were recently asked to rank-order 50 educational programs, and environmental education came in 43rd. When was the last time you saw environmental education on the agenda of a conference or meeting of professional educators? If it appears at all, it usually turns out to be a small section meeting scheduled early in the morning or shortly after the night-life tour bus has departed for the evening. Environmental education articles in professional journals are extremely rare—about as rare as minority persons at a meeting of environmentalists.

The picture isn't much better among resource management professionals. Most agencies have plenty of day-to-day problems and not enough people to handle them. Although most informed professionals agree that a knowledgeable citizenry is absolutely essential to long-term resource management or environmental control programs, they realize that school programs have a rather long lead time—often 10 years or more—and so it is easier to opt for activities which offer a more immediate payoff.

Larry Payne

Handling specimens stimulates new environmental learning for California youngsters.

Larry Paynter

Small visitors learn more about nature's small wonders and how they relate to a total ecosystem.

So, here we are with the environmental education movement some 10 years after the term came into common use. Certainly we've made some progress, but we've got a long way to go, and some quantum leaps are very much in order. What can be done?

Major Tasks

As I see it, if we're really serious and want to do a job, which is absolutely essential to human survival, we have two major tasks facing us: we've got to redefine our terms and concentrate on developing programs which really mean something in terms of making life better for all people, and we've got to learn to work together effectively in order to maximize our impact.

Looking at our first task, let's face it—many people, particularly minorities, see environmental education as more for the birds than for people. If you accept the Jeffersonian ideal—that each person has unique worth and value, and the role of government should be to provide all possible opportunity to develop the individual's potential to the fullest—you will agree that certain conditions must be present for this to be possible.

First of all, a viable physical environment is necessary. Not only must we have adequate resources and acceptable pollution levels, we need the amenities of life as well—natural beauty, historical and cultural resources—a sanative or healing environment as Paul Brandwein defines it. As environmental educators, this is our major responsibility—developing educational programs which lead to such conditions. But let's not lose sight of *why* we're doing it. It is for the long-term and enlightened benefit of *people*. Sure, whales, snail darters, and redwood trees are important and merit our concern, but let's not forget that we must learn to care for and conserve people if we are to have any real widespread credibility—and support.

A viable physical environment is not enough. A viable social environment which provides open access to education, equality of opportunity, political and economic stability, and protects the individual in his person and property, is also necessary. These concerns are usually addressed by those involved in the civil rights movement.

A Matter of Environmental Rights

Isn't it strange that environmental educators and civil rights advocates have not recognized the fact that the ideals they seek are mutually interdependent? We need both—a viable physical environment and a viable social environment. One is useless without the other. Recognition of this interdependence provides us with a means of overcoming the communications problem we have with our term, environmental education.

Why not accept as our major goal as environmental educators a commitment to work for the environmental rights of the individual? The right to clean air and water, the right to a fair share of our natural resources, the right to a healthful and aesthetically satisfying environment for you and your children?

Environmental rights—for all people—now and for the future. Now, there's something we could build on, something which could put us into the real world and help us link up with human rights advocates and other areas of support.

But we're leaving something out. Enjoyment of one's civil rights implies that one will accept the responsibilities and duties of good citizenship. What corresponding obligations go with the environmental rights of the individual? The right to freedom from pollution and other life-destructive factors implies the responsibility to refrain from practices which might impose these hazards on others. The right to benefit from our common natural resource base carries with it an obligation to use all materials wisely for the highest and best good of all. The right to natural beauty and other amenities of life carries with it an obligation to preserve and enhance these treasures so that others, both now and in the future, can enjoy them.

This is not to say that we should abandon our efforts to protect endangered species, preserve natural beauty, or do all those other good works environmentalists consider so important. The job here will be to relate such concerns to the long-term and continuing benefit of people, and this can be done. But, let's face it, any program which is concerned only with birds, trees, whales, and the like, and ignores the environmental rights of people, is doomed to failure. Not only will such programs surely fail, they *deserve* to fail.

Getting it all together

We really need to work together. Now, there's a cliche if ever I've heard one. Many people say it. Few really do it. Why?

In every human transaction there must be something given as well as something received. Both parties must feel that they benefitted or will benefit from the arrangement if they are to be satisfied with it.

Environmental educators, as nearly everyone else, like to feel good about what they do and want the respect of their colleagues. They also have the very human trait of territoriality—that is, each has an area in which he operates and a clientele which he serves. All cooperative efforts must take these factors into account and be supportive of them. Getting down to basic English, if you want my help, respect me for what I can do, make me look good to those I serve, and don't try to take over my turf.

So, now that we agree on *how* we should cooperate, let's get down to who should be involved. If you want to put together an effective national program there are four basic elements you need.

Larry Paynter

California interpreter calls bikers' attention to roadside details and how they fit into nature's larger schemes.

First of all, you need state departments of education. Constitutionally, education is a state function and the state education department is the official governmental arm to administer this function. The state education agency, therefore, is the "front door" for access to the education community. It has the educational expertise, funds, and a delivery mechanism which reaches every teacher and thereby every student in the state, and probably a good percentage of their parents, as well.

State resource management agencie are necessary because they have the specific expertise, sites, materials, and other factors upon which to build an effective program suited to the needs of the people of that locality. Resource management agencies have, in many cases, resources—human and financial—which can be used to good effect, as well as the clout in the statehouse necessary to get things done. Although they can be extremely effective advocates for environmental education, resource agencies generally lack educational know-how, and therefore need to work with the department of education to be effective.

In California, a program is underway through which the state department of education and fifteen state resource management agencies are working together to develop a comprehensive K-12 program for the schools of the state. Instead of doing a hit-or-miss dog and pony show, each agency will concentrate on the things it does best and will relate these activities to all the others. One of the products of this cooperative effort will be a comprehensive K-12 curriculum, together with specific pupil materials for each grade level. Incidentally, if you are interested in what we're doing, drop me a line (at the Department of Education, State Education Bldg., 721 Capitol Mall, Sacramento, CA 94814) and I'll put you on our mailing list.

Although state agencies can put a pretty good intrastate program together, it is nearly impossible for them to do anything on an interstate basis. Out-of-state travel restrictions, and the widespread attitude that if you're paid by the people of the state you should work full time for them, pretty much keeps state people within their assigned borders.

And, so, the third element is that area of government which has the capability of moving across state lines to coordinate programs on a regional and national basis—the federal establishment. Put them all together in a mutually supportive arrangement and you have the capability of developing a really effective program.

Note the term, supportive. The last thing those of us at the state level want to see is Big Brother moving in to tell us what we have to do. It doesn't work in other areas. It won't work in EE.

Regional FICE.

The environmental subcommittee of the Federal Interagency Committee on Education (FICE) represents a real step forward. Through it, the environmental education interests of some twenty federal agencies have been brought together and a number of interesting projects produced. Unfortunately, most of the federal agency field people of the various FICE agencies have never heard of the organization, nor is there any concerted effort to duplicate the FICE cooperative arrangement at the field level. Several field representatives of federal agencies say they can't even do environmental education officially, because they have no authority to do so.

Clearly, federal agencies need to give official permission to their field offices to work with appropriate state agencies on environmental education. Such efforts should be coordinated through some sort of a regional FICE arrangement to avoid the overlaps and conflicts which sometimes occur.

I believe that the Office of Environmental Education in the U.S. Office of Education should set a high priority on developing a network of state education agencies. With its miniscule budget, its best hope of success would be to work through the state agencies to provide technical assistance, and to supply the ways and means for states to get together, exchange information, and coordinate programs. The Office of Economic Opportunity (OEE) and other federal agencies as well, could be of great help to us state level people by urging states which have not done so to create and fund an environmental education position in the state education agency. OEE could also be the catalytic agent which could create the regional FICE committees to interface with state agencies. Once again, this must be a supportive effort if it is to succeed.

The fourth element of the picture at all levels is the so-called NGOs—non-governmental organizations—citizen conservation associations, business and industry, professional societies, museums, and others. Through the Alliance for Environmental Education, some 33 such groups have come together in an effort to exchange information and coordinate programs. Such organizations can do things not possible for government and also serve to put us in touch with major areas of public support.

Larry Painter

Closeup views give youngsters new perspectives on the seashore as a natural habitat.

NGOs are responsible for a number of outstanding programs. The National Wildlife Federation, for example, produces excellent school materials which are widely distributed and used. The American Forest Institute, working with the Western Regional Environmental Education Council, produced Project Learning Tree, which has resulted in the publication of some excellent educational materials and the training of hundreds of teachers in their use. The National Association of Conservation Districts is most effective in developing grass roots support for local environmental education programs. The proposed federal-state coalition needs the NGOs and should actively work to obtain their participation and support.

Gaining Impact

As noted previously, environmental education doesn't enjoy a particularly high priority with the professional education community. Part of the reason is that we've gotten ourselves tagged with the nature study level and so ours is seen as a nice, supplementary program, not particularly important in the lives of youngsters. Redefining ourselves as advocates for environmental rights which go hand in hand with civil rights could be the key to unlocking the schoolroom door.

Another way to penetrate the educational system is to find out what the current trends are and find ways to become a part of them. For example, the basic skills—reading, writing, and arithmetic—are big these days, and environmental education programs can be written in these terms. After all, you can't read reading or write writing. The content of materials used in basic skills programs could well be environmentally oriented.

Well, there's more, and I could go on, but I think I have made the really important points. For further reading, I suggest that you obtain a copy of "Environmental Education—from Ought to Action," published by the Educational Resources Information Center (ERIC), Ohio State University. This is the report on the March 1978 National Leadership Conference sponsored by the Alliance for Environmental Education and held in Washington, DC. Recommendations made by delegates and covered in some detail in the report include:

- Establishment of a national EE Center under the Assistant Secretary of Education.
- Adoption by each state of legislation establishing and funding an environmental education office and program.
- Including EE in the new national Teacher Center program.
- Development of state-level networks to bring state agencies and NGOs closer together.

Send for a copy of this report if you haven't already seen it. A lot of us worked hard on this project, and we hope that it will bring about some serious thought and constructive action.

Closing Note

I consider myself to be a pretty fortunate person to be a part of a national movement which has the potential for making life better for all Americans. It is great to work hard at something in which you believe, but the good news-bad news syndrome gets to me sometimes. Am I kidding myself? Does all this work really mean anything? Will I just go on to gold watch day and see all I've done and believed in sink without a trace? I just can't buy that and I hope you can't either. But, if we don't take a good hard look at what we are and where we are, and find ways of making a greater impact on society, I'm afraid we'll all go the way of the Passenger Pigeon. First of all, let's change our orientation and show everyone that we're really for people and not just for the birds.

We could make a tremendous breakthrough if we can convince people that we're for environmental rights which are interdependent with human rights and therefore a matter of major social concern.

The four major elements working together—state education agencies, state resource management agencies, federal agencies, and non-governmental organizations—can form the basis for an effective national program. But, it must be understood by all that cooperative relationships are based on mutual trust and understanding and that all parties must be willing to give as well as take.

Well, there is a need, no doubt about that. All the pieces are there, too. Let's get busy and start putting things together.

Rudy Schafer is a former Los Angeles City school teacher, administrator, and public information officer, who spent eleven summers working as a National Park Service Ranger. He is now Environmental-Energy Education Program Director for the California State Department of Education.

A former member of the National Advisory Council on Environmental Education, he has been involved nationally in EE, and recently completed a term as president of the Alliance for Environmental Education. He chaired the National EE Leadership Conference, sponsored by the Alliance, and held in Washington, DC last March.

A New Partnership: Environmental Education and Recreation

by Barbara B. Clark

The provision for satisfactory recreational experiences to the public is one dimension of the national quest for environmental quality of life for all citizens. Recreation providers are currently seeking mechanisms for ensuring that the public will continue to have those satisfactory experiences within a quality environment whether it be in our large urban areas or on our more remote lands. Environmental education may be one means through which the recreation community can achieve its goal to fulfill the recreational needs of our citizenry.

1978 Nationwide Outdoor Recreation Plan
Environmental Education Task Force Report

National Park Service

The goal of both outdoor recreationists and environmental educators is a healthful, human-nourishing environment.

In the fall of 1977, the former Bureau of Outdoor Recreation, now the Heritage Conservation and Recreation Service (HCRS), initiated development of the third Nationwide Outdoor Recreation Plan. Prepared on a five-year cycle schedule, the Nationwide Plan is a policy document whose preparation is mandated by Congress as a necessary step in the process of defining responsive federal actions in outdoor recreation. It is a comprehensive statement of *what is*, in terms of needs and public demand in outdoor recreation, and an equally important statement of *what could be*, based on those identified needs.

The plan is the most complete source of public and private outdoor recreation information available to the public. But, more significantly, it defines outdoor recreation priorities, because it functions as an advisory document for the Secretary of the Department of the Interior, Congress, and all other levels of government. The Nationwide Plan is, then, a framework for goal setting—a set of recommendations that will determine a course of action at the federal and state levels which, in turn, will result in the continued provision for recreation spaces and facilities for all Americans.

The Need Identified

The building blocks of the 1978 Plan were problem statements solicited from the public, presenting its perception of outdoor recreation issues of immediate national priority. HCRS conducted its solicitation during the winter of 1977-78, receiving well over 1,000 responses to its inquiry. After thorough analysis and evaluation, HCRS and the Secretary of the Department of the Interior, Cecil Andrus, ultimately identified seventeen of the most critical issues.

Among the seventeen was the question of a new and expanded role for the federal land management agencies in the provision for environmental education. These agencies include: the U.S. Forest Service; the National Park Service; the U.S. Fish and Wildlife Service; Bureau of Land Management; Corps of Engineers; Tennessee Valley Authority; and Bureau of Indian Affairs.

The Issue

There is a very intimate relationship between our national outdoor recreation goals and the goals of environmental education. The 1974 Nationwide Plan observed that:

"A philosophy of conservation which considers the quality of life and the environmental and man-made elements that produce environmental quality should be instilled in greater numbers of people.

"If accepted and practiced, such philosophy would prepare people for constructive and satisfying use of leisure time in the out-of-doors. It also would build a strong foundation for individual and community stewardship of natural resources."

It makes sense, then, to begin to consider the mutuality of outdoor recreation and environmental education goals since the ultimate product of both enterprises is an environment in which prospects for human well-being are continually nourished. A sense of well-being is directly related to the quality of our national environment, a large part of which is used for outdoor recreation purposes. And major providers of outdoor recreation space are the federal land management agencies. Hence the issue of their role in providing a kind of education that effects that environment and the quality of the experiences it provides.

The Study

The feasibility of the land management agency roles in environmental education was examined by an Environmental Education Task Force during the early summer of this past year. Agency missions, programs, current policies, and initiatives were studied and synthesized into a formal report. Following is a summary of the major findings of the task force:

- Most federal agencies have missions compatible with environmental education.
- The quality, effectiveness, and emphasis of environmental education programs vary considerably among and within federal agencies.

National Park Service

A Nationwide Outdoor Recreation Plan task force has emphasized the adult recreating public as the prime target for environmental education.

- The potential for federal land areas to serve the nation as outstanding examples of ecologically sound management is often unfulfilled.
- There is a national need to provide environmental education to the public in particular but not limited to the recreating public.

These findings were put into action recommendation form and transmitted to the HCRS. Essentially, the Environmental Education Task Force report called for a strong visible role for federal land management agencies in provision of environmental education to the public, in particular the recreating public which uses lands managed by various federal agencies for a myriad of outdoor recreation purposes.

It was not within the scope of work of the task force to consider other recreation land managers such as the states, counties, or local governments; however, it seemed to follow that the findings of the task force were essentially descriptive of the current national picture which would include other levels of government.

Present Focuses, Recommended Improvements

The federal agencies were found to be offering a variety of programs in environmental education as a part of their overall protection or multi-use or recreation missions. To some extent, certain agencies perceived a greater stake in environmental education than did others. This factor influenced their degree of involvement and commitment to it. Generally speaking, none of the agencies made direct programmatic connections between their educational and recreational programs. Most agencies did not show environmental education as a line item in the budget. Again, most agencies, but not all, perceived their educational clientele to be youth; their most visible programs were youth oriented. And within those programs, ecology, outdoor education, and nature study were emphasized.

Most of these programs were formal in nature and not linked to ongoing recreational activities. The recreational community—its professionals and those it serves—were found to be incidental or an indirect clientele of land management agency educational programs.

The Nationwide Plan Environmental Education Task Force strongly recommended that the recreation community become a *direct* client of the environmental education programs of federal agencies, particularly the land management agencies. It also recommended that within these agencies environmental education should become, by whatever procedural means, a deliberate complement to each of their respective missions rather than a side issue or an administrative gesture.

A Model for State Programs

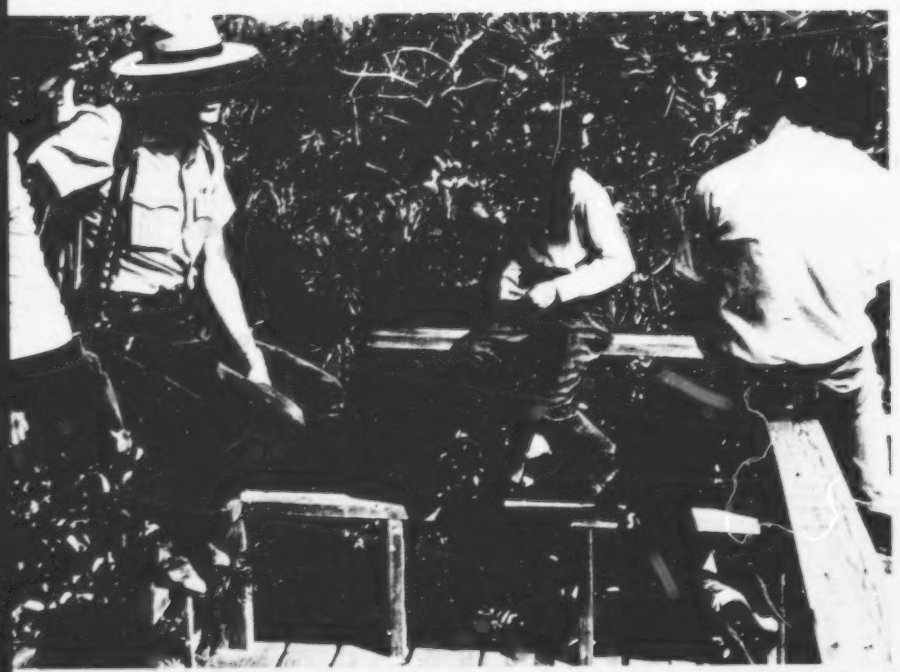
A newly formed and highly visible partnership, as suggested by the task force and environmental educators at the federal level, also can provide the necessary leadership for the states which own and/or administer significant recreation acreage. As with federal recreation lands, states are also experiencing problems brought about by increasing use of limited space. People pressures are affecting the quality of the environment as well as the quality of the recreation experience. This situation is liable to reach critical proportions in the future.

All levels of government should be planning now to minimize these impacts. An element of that planning must include an educational strategy which equips the user public with a new environmental conscientiousness and with a more deferential attitude toward its recreation resources.

Sound Ecosystem Management Needed

While the task force emphasized the adult recreating public as a prime target for environmental education, it also sought to examine the policies and practices of recreation resource managers and management agencies as they relate to the implementation of sound environmental management procedures. William E. Brown, in his book *Islands of Hope*, which examines the role of the park and recreation profession in this time of environmental concern, states that:

" . . . today, the typical park or recreation area is managed on the principle that administration, maintenance, protection, and interpretation are separate functions rather than facets of an integrated whole. Thus does a planner or designer, unaware of ecological factors at the site, encourage developments that are the curse of park managers and maintenance men. Thus do builders destroy scenery and habitats in the very act of constructing access to them. Thus do wildlife managers violate ecosystems to increase the game harvest. Thus do programmers and budget directors set priorities and allocations that force park managers into shoddy, environmentally destructive operations."



National Park Service

Park personnel should be trained in sound ecosystem management principles—and in interpreting these principles to their visitors.

National Park Service

Most existing environmental education programs are youth-oriented.

Perhaps we can account for this state of affairs in part if we look at the relatively low priority federal, state, and local decision makers place on providing recreation services and facilities to the public. The effect of Proposition 13 in California is an outstanding example of the public's perception of those priorities. But recreation management problems are not all financial ones. They are also philosophical and educational in nature, stemming perhaps more from a lack of application of scientific and interdisciplinary management strategies than from a scarcity of money.

What is needed is an integration of the planning and management functions with operations and maintenance, all of which should take place under the umbrella of a sound ecosystem management philosophy. This calls for a kind of education that would result in a more holistic approach to management problems, both from a resource and people management point of view.

Obtaining and applying this education would not appreciably increase the budgets of recreation resource agencies. Rather, a commitment to environmental education and training programs that make evident to managers the benefits of properly integrated management approaches, would result in benefits to both the public and the resource that far outstrip the cost of training.

Challenges for the New Partners

The elements of these programs are not appreciably different from those recommended for youth and for the recreating public. Thus it would appear that the recreational community and the environmental education community should work closely together to mutually develop training and educational programs appropriate to the needs of the recreation providers and the clients.

Together, they should develop environmental management standards and criteria which would become the basis for enlightened resource management. These standards and criteria should be incorporated into the professional curricula of the many colleges and universities which currently supply the manpower for the profession.

Operations and maintenance staff should be provided with in-service education programs which focus on contemporary management problems and their solutions in a sociological and ecological context rather than in financial or expediency contexts.

Administrators, and other decision makers in resource agencies or recreation departments, must begin to look at the long-term implications of their *now* decisions and work closely with planners whose skills enable them to predict consequences of today's decisions on tomorrow's resources. Most importantly, these people should deal with the realities of the interactions of the social and natural processes which, in a large measure, is their professional and career reason for being. Their decisions are the ones that will provide us with adequate future recreation sites which, by definition, are people places. Understanding the reciprocity between the environment and the people who use it is a prime responsibility of the recreation administrator because it is his/her vision that will shape the future of the resources.

The Nationwide Plan Environmental Education Task Force attempted to make a strong case for developing close professional ties between the recreation and environmental education communities. It did so out of a belief that environmental quality is achieved through environmental education and sound environmental management of recreational resources. The task force recognized that adult environmental education programs for recreation managers and the user public were needed in order to assure that quality resources would be available to all citizens, now and in the future. It places the responsibility for the conduct of such programs squarely in the laps of the federal land management agencies. It suggested that the federal agencies should take the lead in this arena and, by example, influence state and local agencies.

The Ultimate Benefit

Beyond the recreation community, the land management agencies, and other resource-related arms of government lies the rest of the world. The world of the built environment, the cities and towns, the world of industry, of developers, and other users of the nation's resources. How can the educational and recreation profession have an impact on these elements of our society?

The task force strongly believes that it is necessary to upgrade the quality and content of the visitor programs in place in our national parks, wildlife refuges, and other national natural and cultural resources. It believes that an environmentally informed public is a public that will extend its conscientiousness beyond the boundaries of a given recreation site, into its communities and neighborhoods, to the benefit of all.

For this to happen, the "message" of the recreation resources must be a clear one. The manner in which an area is managed for preservation of its resources, as well as for use by the public, should be interpreted to the user. Exemplary management practices should be highlighted and demonstrated when possible. Measures taken to reduce people impacts on particularly fragile resources should be explained. The way in which the federal agencies deal with air and water pollution, solid waste management, and energy consumption can be successfully transmitted to the public who, in turn, can transmit it to community decision makers.

It is wholly within the national interest to utilize recreation spaces as examples of sound environmental management, and thence as teaching laboratories to an interested public which is certainly the ultimate stakeholder in the quest for national environmental quality.

Barbara B. Clark is an Environmental Education Specialist in the National Park Service. Formerly, she was Assistant Commissioner for Planning in the Minnesota Department of Natural Resources.

Environmental Education and Energy Management at Mesa Verde National Park

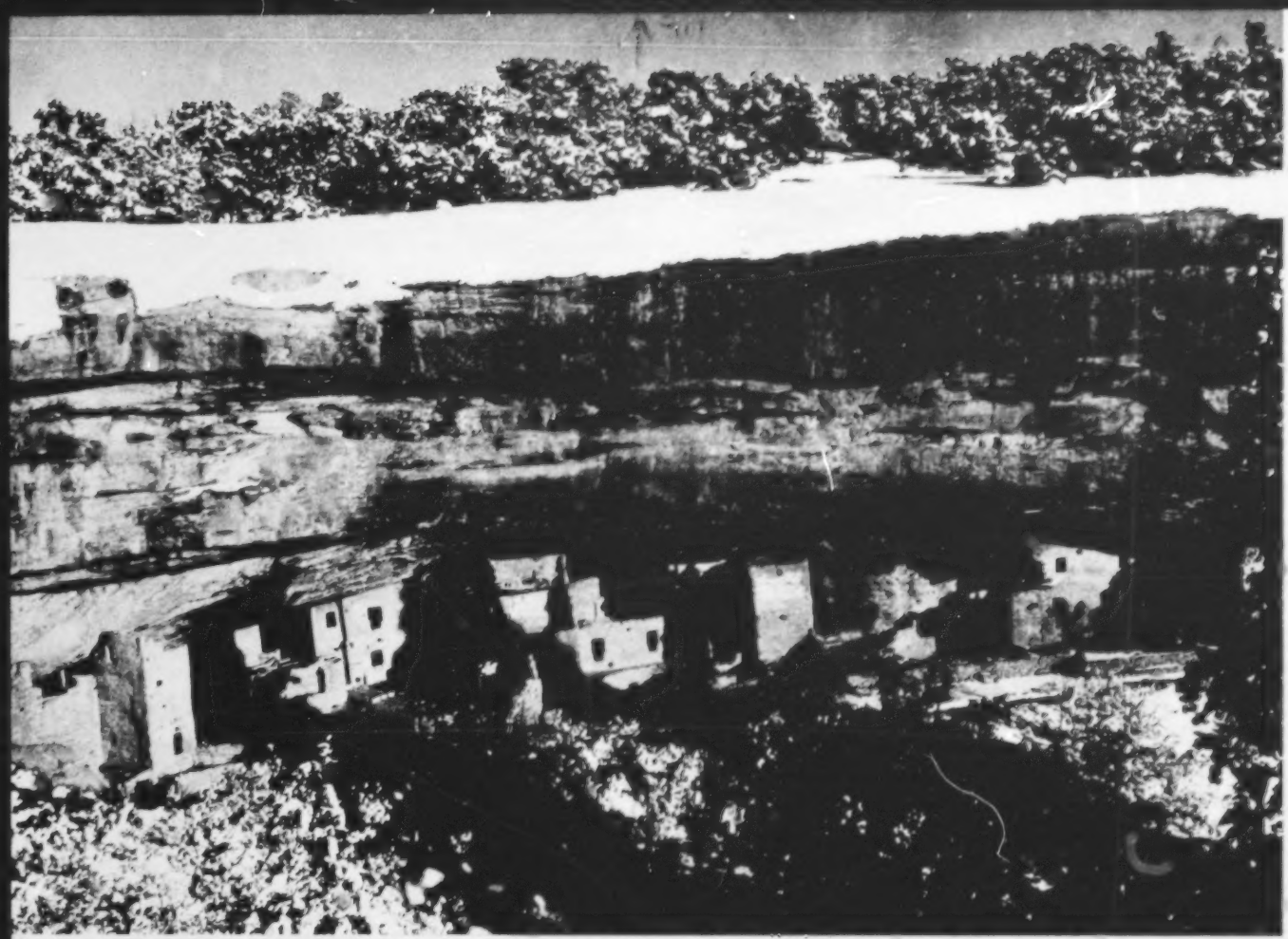
by Ronald R. Switzer

Remains of drought-resistant corn from Mesa Verde National Park.

In 1977, when the Department of the Interior began to think about its mission to meet the requirements of Executive Order 12003, "Energy Policy and Conservation," we here in Mesa Verde National Park were just beginning to develop an environmental education program in response to the Environmental Education Act, P.L. 91-516. As we began to re-think the history of the Pueblo Indian people (called the Anasazi) who once occupied the park, we came to the realization that there had been a close relationship between the ways in which they adapted to and exploited natural ecosystems and their use of energy.

Early in their history, the Mesa Verde people realized that energy storage was very important. They learned to farm, and as energy came to be available to them in the form of corn, they learned to store it in times of plenty so that they could feed the people in times of trouble. Perhaps more significant was the fact that a fairly dependable food supply made it possible for them to develop technology to exploit ecosystems and affect the ability of their ecosystems to support life. The Anasazi prospered at Mesa Verde until about A.D. 1275, when they moved to other areas of the Southwest. Modern man may never know all of the reasons for the abandonment of the area, but certainly resource exploitation and energy utilization was suspect. The mesa environment that had provided for their needs so well ultimately became a limiting factor to their existence. The resources of the Mesa Verde may have been so altered by the Anasazi that nature could not provide the energy necessary to sustain the culture as fast as man required.

Because of these basic realizations, we called our environmental education program "Man and His Environment." We chose "adaptation" as our theme, primarily because prehistoric man's interrelationship with nature (good and bad) is clearly represented at Mesa Verde



Gilbert Wenger

Spruce Tree House cliff dwelling, under a winter blanket of snow, shows the natural southwest exposure of the buildings to the sun's rays.

and is one from which virtually every sector of modern civilization can learn and benefit.

Prehistoric Man's Relationship to Mesa Verde Environment

Looking closely at a low-energy society like the Anasazi, we see that their simple agricultural system used very little energy to produce food; that is, for every calorie of human energy expended, a calorie of food could be produced. This fact becomes especially interesting if we consider that the kind of corn grown had become a drought-resistant strain which further lowered the amount of human energy required to water it.

Compare Anasazi agriculture with our modern mechanized, centralized system of food production and some startling facts come to light. In the 1976 Energy Conservation Planning Workshop, Wilson Clark, author of *Energy for Survival*, pointed out that the high-yield, monocultured strains of corn we grow today are very vulnerable to disease infections and have no natural resistance. In addition, he noted that these hybrid seeds respond most favorably to high energy inputs of water, fertilizer, and mechanized equipment. Circular irrigation systems which water 160 acres (64 ha) at a time use energy equivalent to a city of 10,000 people. Today, say Clark, six varieties of corn account for 71 percent of our production, and we expend 35 to 50 calories of non-renewable fossil fuel to produce each calorie of corn.

A further example illustrates factors which we emphasize in our environmental education effort. Through the use of water collection reservoirs, distribution ditches, and check dams to retard silt loss, by rotating fields when soil nutrients became exhausted, living in semi-subterranean energy-efficient earth lodges, and eventually in cliff dwellings whose mass absorbed solar energy because of their natural southwest exposure, the Anasazi were able to exist at Mesa Verde for about 700 years. Why then, if they were so efficient, were they forced to leave the region?

One theory is that the abandonment of Mesa Verde came in response to the development of exploitive technology which promoted the growth of a population too large to sustain itself in an environment where the natural ecosystems were marginally nurtured and slow to recover. When severe drought struck the region in A.D. 1275, the brittle and traditional cultural response to environmental stress was inadequate. Declining subsistence caused a corresponding decline in population and promoted social strife, which eventually forced the Mesa Verdeans to relocate to environments not yet exploited by their unchanging agrarian technology. In one respect the Anasazi had a distinct advantage over modern society: They could move away from their resource depletion problems; we cannot.

That they lasted so long and were so successful in their adaptation to the region was due largely to their lifestyle, one which was exemplified in their religious respect for all living things.

Gilbert Wenger

Prehistoric check dams catch silt and moisture at Mesa Verde. Such terraces created energy and environmentally efficient farming areas in an arid environment.

Their philosophy was to fit in with the framework of nature, and their heritage of skills enabled them to constructively use hundreds of nature's products.

Current Energy Management Practices

As a manager of both cultural and natural resources, I have become sensitized to energy problems past and present. Without making it sound as though civilization is rushing toward destruction through its slowness in learning to use energy wisely, we have attempted to endow our environmental education program with some hindsight, sensitivity, and knowledge that may provoke creative thinking about energy in the minds of the young people to whom the program is primarily addressed. Our mission is to manage the park and environmental education program in such a way as to induce respect for the structure of nature and its gifts, and a restraint in using them. We believe this can best be accomplished through interpretive programs for the public and by setting the example with sound environmental management practices.

During the past five years the park has monitored fuel use in an attempt to identify high energy use vehicles and facilities, and taken steps to correct the problems identified. We have insulated park buildings and residences, replaced inefficient heating systems, and installed wood stoves and fireplaces as supplemental or alternate sources of heat. Double pane windows have been installed in many buildings, and we have managed our housing to minimize single occupancy and the unnecessary use of poorly insulated structures. Only cold water is provided in park restrooms and the park has closed facilities during the winter months when few people visit and open facilities would consume large amounts of fuel. Fuel consumption has been further reduced by the use of compact vehicles and the implementation of an energy-efficient alternate transportation system to the west side of the park.

Coupled with these measures, traffic in visitor use areas is routed in such a way as to eliminate backtracking and duplication of travel. Limitations on backcountry use have helped preserve both cultural and natural resources, and have reduced energy required to develop and maintain backcountry roads and trails. Because Mesa Verde is within commuting distance of several nearby communities, we have developed two year-round close-to-home environmental study areas for use by schools in studying the interaction between man and his environment. Through special funding, school groups are bussed to the park for day use of these study areas.

Water use has been reduced 25 to 33 percent through the implementation of a strong public awareness program, the installation of water conservation devices, and the development of cooperative conservation programs with the park concessioner. At present, Mesa Verde is studying the possible uses for water reclaimed from our newly opened wastewater treatment plants.

Mesa Verde has become heavily involved in water quality studies and public workshops, in an attempt to assist local communities in the development of water quality programs that will meet the provisions of Public Law 92-500. Finally, the park, in cooperation with the Environmental Protection Agency, serves as an air quality monitoring station for Southwest Colorado. Air pollution abatement is an important future goal, if we are to maintain the visual integrity of park resources and the quality of visitor experience.

Meshing these two programs—energy conservation and environmental education—has become an exciting endeavor here at Mesa Verde, and the examples we find in the Anasazi culture provide excellent learning opportunities for young people. Perhaps our approach will inspire other institutions to do the same with whatever unique resources they may have at their disposal.

Ronald R. Switzer is Superintendent of Mesa Verde National Park in Colorado.

A National Center for Environmental Education

by Alexander J. Barton, Walter E. Jeske, and George L. B. Pratt

When the United States Delegation returned home a year ago from the United Nations' Intergovernmental Conference on Environmental Education in Tbilisi, USSR, its members brought with them an accomplishment and a challenge:

- *The accomplishment* was an internationally endorsed set of goals and objectives for environmental education (EE), buttressed by a worldwide set of official governmental commitments to the realization of those goals. (See boxed inset.)
- *The challenge* was to develop a national strategy by which education in America could make its maximal contribution to protecting and improving the nation's natural and human environments.

This article will assess what has been done during the past year to move toward these goals, and suggest what next steps are needed to insure that the present momentum is not lost.

Well-Defined Sphere of Responsibility

America's environmental education movement enjoyed several important advantages as it took up the Tbilisi initiatives. The first of these was the existence of a detailed and objective definition of EE's sphere of responsibility, spelled out in the Federal Interagency Committee on Education's *Fundamentals of Environmental Education*. This publication had been given extensive distribution during the year preceding the UN meeting. By defining the content of EE within a holistic framework of basic ecological principles, the *Fundamentals* provided an integrated intellectual structure within which natural scientists, social scientists, educators, political leaders, industrialists, and broadly-concerned environmentalists all could find complementary and mutually supportive places.

Supportive Political Climate

The second advantage enjoyed by American EE in the immediate post-Tbilisi period has been the existence of a supportive political climate—one that starts at the grass roots and extends deep into the centers of government, science, education, and business. A broad public sense of responsibility toward the planet's fragile life-support system was being encoded into environmental protection legislation and supported by growing corporate responsibility, advancing scientific and technological know-how, and hitherto unmatched allocations of fiscal and human resources.

A slowing of the nationwide decline of air quality and a reversal of the downward trend in water quality had encouraged the American people to believe that a great industrial nation *could* live harmoniously with its environment, and that conviction had strengthened their resolve to do so, despite the substantial costs involved. Indeed, recurring shortages of energy and of other essential materials had convinced many people in and out of government that what humanity could no longer afford was the price of irresponsible environmental behavior.

Existing Cadres of Environmental Educators

Our third major source of strength was the existence of several nationally significant cadres of environmental educators.

Within the federal government, the executive agencies had centers of EE activity—among them the Office of Environmental Education (OEE) in the Department of Health, Education and Welfare (HEW), and the Federal Interagency Committee on Education (FICE)'s active and influential Subcommittee on Environmental Education (SEE). OEE's staff, budget, and ongoing program for technical assistance were proof of significant EE legislation already on the books. SEE represented a model of how independent agencies, each with their own mandates and missions, could greatly increase the efficiency and the effectiveness of their programs through cooperation, joint planning, and mutual facilitation in many forms. The active interest of several influential Members of the two Houses of Congress (and a generally sympathetic and receptive attitude on the part of many other Members) was one of the most essential strengths of all. Even the third

National Park Service

The supportive political climate for environmental education rests on a growing realization that we can live in harmony with our environment.

branch of government—the federal judiciary—had been actively supportive of environmental concerns, contributing significantly to the body of relevant "case law" in recent years.

Enormous strength for EE lay also in the private sector—in the large number of voluntary associations dedicated to conservation, wildlife, outdoor recreation, etc.; in commercial and industrial concerns whose activities have significant environmental impacts; and in the ranks of scientists, educators, urban planners, engineers, and professionals in other environmentally-related fields. Many non-governmental organizations (NGOs) had joined in a loose confederation—the Alliance for Environmental Education—which provided a valuable focal point for this diverse segment of the EE community.

Professional scientists and serious amateurs exchanged views and discoveries through such channels as the American Association for the Advancement of Science, the Ecological Society of America, American Institute of Biological Sciences, and the American Institute of Architects. Those whose main interests lean toward education were active in the National Science Teachers of America, National Association of Biology Teachers, National Council for Geographic Education, National Council for the Social Studies, etc. The Conservation Education Association and the National Association for Environmental Education offered forums in which experts from environment and education could merge their insights.

At the state and local governmental levels, environmental education varied all

National Park Service

Any plan will have to provide for appropriate division of labor among elements of the private sector and the various levels and agencies of government.

the way from non-existent to well-grounded and vigorous. The newly formed State Environmental Education Coordinators' Association provided hope for early progress on this front, while other promising points of entry included the Council of Chief State School Officers and the International Association of Fish and Wildlife Agencies.

These, in summary, were the very considerable assets available to America's EE community one year ago when our delegation returned home from Tbilisi with a commitment to the world movement that it would bend every effort to the creation and implementation of a coherent national strategy for EE.

Establishing Priorities

Our first step was to condense the 41 UNESCO Conference recommendations into a form meaningful to the American audience, to establish some sense of what items should be given priority in a highly developed country like our own, and to give them wide dissemination. *Toward An Action Plan: A Report on the Tbilisi Conference on Environmental Education* was published by FICE in March, 1978. (See reference listing following article.)

The Alliance for Environmental Education convened the 1978 Leadership Conference for EE in Washington, DC, late that same month—March, 1978. Eighty-seven participants tackled an agenda aptly titled "From Ought to Action in Environmental Education." That conference focused on positive, purposeful, and practical action for EE. Working groups of participants concentrated on five critical areas: the federal role, state legislation, state-level networking, in-service teacher education, and the accessibility and dissemination of materials. Its report (now available through ERIC/SMEAC; see box) contains four noteworthy items:

- A comprehensive collation of all the major EE events since 1970 and a distillation of their principal outcomes, prepared by Dr. William Stapp under the title, "Elements of a National Strategy for EE."
- A keynote analysis of needs and opportunities by Dr. Mary Berry, Assistant Secretary of HEW for Education and Head of the U.S. Delegation to Tbilisi.
- A paper by Alexander Barton which discussed a set of "Perspectives on a National Strategy for EE."
- 16 carefully crafted recommendations for the immediate attention of policy makers responsible for EE performance in the U.S.

Need for a National EE Center Identified

Barton's paper presented the thesis that "Many observers of EE in the U.S. are convinced that the movement's number one problem is its lack of cohesion. We are many bodies (some federal, some state, many private) in need of a head. The arms, the branches, all are laboring mightily, but without enough coordination."

In the same vein, Dr. Mary Berry had argued that "We must move toward a coherent national strategy for EE that takes full advantage of the strength of our diversity. We must make sure that all essential items are provided for, that unnecessary redundancies do not squander our resources, and that adequate coordination is maintained . . . . Any strategy or plan will have to provide for appropriate division of labor among the various elements of the private sector . . . and the different levels and agencies of government."

The Leadership Conference reacted by adopting as its number one recommendation the establishment of a National Center for Environmental Education.

Faced by the great diversity of organizations and individuals who serve in the EE movement, and aware of how widely dispersed they are geographically, socially, and economically, Berry and Lowe (see reference listing) have also concluded that the Tbilisi delegates were right in calling for each nation to "establish a National Center on Environmental Education to coordinate the multidisciplinary, multi-agency responsibilities and focus upon the interdependence and interrelatedness of environmental problems, issues, and systems: energy, environmental, ecological, ethical, economic, political, social, scientific, technological, and educational."

A task force from FICE's SEE also has endorsed this recommendation. Chaired by George Pratt, this task force has been considering ways and means for establishing such a center, its organizational structure and relationships, and its mandate.

A Possible Model

While deliberations are not yet complete, a possible model which Pratt's task force has examined is one in which the EE Center would be staffed by a professional nuclear staff along the lines of the Comprehensive Employment and Training Act (CETA), Title V, National Commission for Manpower Policy Staff. The novel and important feature of this plan is that the small permanent staff would be augmented by additional full time individuals, detailed on a rotating basis but for an extended period from their regular duties with various of the scientific-research, resource-based, and other interested federal agencies, from state and local governmental bodies, from business and industry, and from the private conservation and educational agencies. The Director of the National EE Center, according to the CETA model, would be a GS-18 level executive, appointed by the Commissioner of Education (if a new Department is created, the Secretary), with the advice and approval of an EE Advisory Commission.

The latter, SEE's task force suggests, might be composed of representatives of the Secretaries of Agriculture,

Commerce, Defense, Energy, HEW, Housing and Urban Development, Interior, and Labor, and of the heads of selected independent agencies such as the Council on Environmental Quality, the Environmental Protection Agency, the National Endowment for the Humanities, the National Science Foundation, the Office of Management and Budget, the Smithsonian Institution, and the Tennessee Valley Authority. To these governmental representatives would be added a number of public members representing the National Academies of Engineering and Science, perhaps, and other appropriate educational and scientific bodies. Participation of advisors from the legislative branch, perhaps the Legislative Reference Service and the Office of Technology Assessment, should also be invited.

Functions of the Center

The Center would be located in Washington, DC, in the proximity of the Education Secretariat. Potentially important functions of the Center might include:

A. Promoting collaboration among environmental education associations, federal government agencies, citizen groups, and scientific, research, and education communities.

B. Establishing a communications network with teacher centers, state and local education systems, and non-governmental organizations involved in environmental education.

C. Supporting and participating in an international network of such environmental education centers.

D. Serving as a mechanism for public involvement in environmental education decision-making processes.

E. Monitoring progress toward stated objectives in environmental education.

F. Monitoring and reporting on the state of the art of environmental education.

G. Assisting the Office of Environmental Education in defining what technical assistance is likely to be most effective.

Internationally Endorsed Goals, Objectives, and Guiding Principles for EE

At the Intergovernmental Conference on Environmental Education, held in October 1977 in the USSR, the following goals, objectives, and guiding principles for environmental education were adopted by delegates from the 66 nations officially represented. There seems to be consensus about them in the environmental education community in the United States.

The goals of environmental education:

1. To foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas.
2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment.
3. To create new patterns of behavior of individuals, groups, and society as a whole towards the environment.

The categories of environmental education objectives:

1. Awareness: to help social groups and individuals acquire an awareness of the sensitivity to the total environment and its allied problems.
2. Knowledge: to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems.
3. Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.
4. Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.
5. Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

Some guiding principles—environmental education should:

1. Consider the environment in its totality--natural and built, technological and social (economic, political, technological, cultural-historical, moral, aesthetic).
2. Be a continuous lifelong process, beginning at the preschool level and continuing through all formal and nonformal stages.
3. Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective.
4. Examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographical areas.
5. Focus on current and potential environmental situations, while taking into account the historical perspective.
6. Promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems.
7. Explicitly consider environmental aspects in plans for development and growth.
8. Enable learners to have a role in planning their learning experiences and provide an opportunity for learners to make decisions and accept their consequences.
9. Relate environmental sensitivity, knowledge, problem-solving skills, and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years.
10. Help learners discover the symptoms and real causes of environmental problems.
11. Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills.
12. Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and from first-hand experience.

We must consider the environment in its totality—natural and built, technological and social.

National Park Service

National Park Service

Environmental education must utilize diverse learning situations and a broad array of approaches.

H. Assisting in the planning for environmental education research and development.

I. Acting as a clearinghouse and information center in environmental education training.

Such a Center's largest single expense—professional staff salaries—would come mainly from the public and private agencies whose regular employees were assigned to serve in it. Other expenses such as support staff, space, services, and equipment would need to be provided from appropriated funds.

The cost-benefit arguments presented in the SEE task force report seem cogent and persuasive. For example:

- Research has shown that the American public disposes of an average of six pounds (2.7 kg) of solid waste per person per day, at a cost of two cents per pound. Education resulting in abatement of one-tenth of one percent of our solid waste (a goal so low that nobody doubts that it can easily be achieved) would be worth $9.5 million, much more than OEE expends in a year.

- Research conducted by the Council on Environmental Quality and the American Medical Association (adjusted for inflation) shows that the American public is paying in excess of $75 billion in health costs that can be directly attributed to the environment and its problems. Education that would alleviate one percent of this staggering total for a single year would save enough to run the proposed EE Center well into the twenty-second century!

A Challenge for All

In advancing this proposal for a National EE Center, we do not delude ourselves that such a Center will automatically result in a coherent national EE strategy, nor that it will obviate the need for attention to many other recommendations that remain pending. Even a cursory review of the June, 1978, FICE report on "EE Activities of Federal Agencies" (see reference listing following article) will reveal to the reader that creation of a coordinating body such as the EE Center would reap efficiencies and other benefits whose value would greatly exceed the Center's cost. If such a Center could also enlist the voluntary cooperation of even a small part of the state and private organizations concerned about EE, the gains would be inestimable.

Indeed, we are concerned that unless some effective mechanism is established for improving coordination across the plethora of environmentally active organizations and individuals, we may never achieve an integrated national program of environmental education that involves a continuing education process from early childhood to adulthood, to be carried out by both the formal and nonformal educational institutions in cooperation with the international sector, the federal, state and local governments, and the wide variety of concerned non-governmental organizations, as called for by Dr. Mary Berry.

Publication of this brief rationale is intended to stimulate a constructive discussion among interested parties, lead to needed elaborations and refinements of plans for the Center, and foster its creation. Comments, criticisms, and commitments are welcome. Please address your reactions to SEE's chairperson, Walter Jeske, c/o FICE, Room 313H, Hubert H. Humphrey Building, 200 Independence Avenue, S.W., Washington, DC 20201.

Alexander J. Barton is Development Program Director of the National Science Foundation's Division of Science Education Development and Research.
Walter E. Jeske is Chief of the Education and Publications Branch of the Soil Conservation Service, U.S. Department of Agriculture.
George L. B. Pratt is Special Assistant for Work Education in the Office of the Secretary, U.S. Department of Commerce.
Mr. Jeske is Chairman, and Mr. Barton and Mr. Pratt members, of the Subcommittee on Environmental Education of the Federal Interagency Committee on Education (FICE).
The views expressed in this article are those of the authors, not necessarily the official policy of their agencies.

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Members, Subcommittee on Environmental Education
Federal Interagency Committee on Education

Executive Office of the President
- Council on Environmental Quality

U. S. Department of Agriculture
- Forest Service
- Science and Education Administration – Extension
- Soil Conservation Service

U. S. Department of Commerce
- Office of the Secretary
- National Oceanic and Atmospheric Administration

U. S. Department of Defense
- Army Corps of Engineers
- Department of the Navy
- Overseas Dependent Schools

U. S. Department of Energy

U. S. Department of Health, Education, and Welfare
- Office of Education
  - Office of Environmental Education
  - Division of State Educational Assistance Programs
  - Division of International Education
  - Energy and Education Action Center
  - Community Services and Continuing Education – Bureau of Higher Education
- Public Health Service
  - Office of Population Affairs
  - Office of Health Information and Promotion
- Alcohol, Drug Abuse and Mental Health Administration
  - Center for Studies of Metropolitan Problems
  - Unit for Research in Behavioral Systems
- National Institutes of Health
  - National Institute for Child Health and Human Development
    - Center for Population Research
  - National Institute of Environmental Health Sciences

U. S. Department of Housing and Urban Development

U. S. Department of the Interior
- Office of Assistant Secretary for Fish, Wildlife and Parks
- Bureau of Land Management
- Fish and Wildlife Service
- National Park Service
- Heritage Conservation and Recreation Service

U. S. Department of State
- Bureau of International Organizations
- Agency for International Development

Independent Agencies
- Environmental Protection Agency
- Federal Aviation Administration
- National Aeronautics and Space Administration
- National Endowment for the Humanities
- National Science Foundation
- Small Business Administration
- Smithsonian Institution
- Tennessee Valley Authority
- Pan American Health Organization

Affiliates of the Alliance for Environmental Education

- American Association of State Colleges and Universities
- American Federation of Teachers
- American Forest Institute
- American Gas Association, Inc.
- American Institute of Architects
- American Nature Study Society
- American Society for Environmental Education
- Association for Environmental and Outdoor Education
- Boy Scouts of America
- Conservation Education Association
- Edison Electric Institute
- Foresta Institute
- Girl Scouts of the U.S.A.
- Humane Society of the United States
- International Council on Health, Physical Education and Recreation
- Izaak Walton League of America
- League of Women Voters of the United States
- Massachusetts Audubon Society
- National Association of Conservation Districts
- National Association for Environmental Education
- National Audubon Society
- National Council for Geographic Education
- National Council for the Social Studies
- National Education Association
- National Parks and Conservation Association
- National Science Teachers Association
- National Wildlife Federation
- The Nature Conservancy
- Soil Conservation Society of America
- United Auto Workers/Conservation Department
- Western Regional Environmental Education Council
- Wildlife Management Institute
- Zero Population Growth

Chicago Architecture Foundation

Participants learn to make impressions of building parts and neighborhood objects in a "Rubbings Celebration" sponsored by the Chicago Architecture Foundation.

Appreciating Our Built Environment

by Pamela Caldwell

Put your arms around a column! Adopt a building! Clean up a neighborhood! Explore your city! Children across the country are discovering the rich offerings a community gives to all who open their eyes and lift up their heads to take note of their surroundings. Every building in every city and town, regardless of size, age, and architectural detail, has a story to tell and can be used effectively as a teaching tool by schools, parks, historical societies, and civic organizations. The intense feelings children often develop about a building contribute to the values clarification process which, as adults, we all undergo when deciding whether or not to save a building from demolition.

National Trust's Search for Programs

The National Trust for Historic Preservation is the only national, non-profit, private organization chartered by Congress to encourage public participation in the preservation of sites, buildings, and objects significant in American history and culture. This past summer the Education Services Division of the Trust sought to determine what teachers throughout the United States do to help students gain an appreciation of the built environment. The results of its findings, the examples of which may serve as models for future projects, are available from the Trust. Ellen Kotz, a summer intern and graduate student in architecture, has compiled "A Guide to Preservation Education School Programs: Kindergarten-12," and Pamela Caldwell, an elementary school teacher and consultant, has updated "A Teacher's Guide to Preservation-Related Materials: A Select Guide to *Education Index* Articles."

Examples of the types of projects noted, follow. Though all the projects cited here were undertaken by schools, many are adaptable for use by parks or as cooperative school/park ventures—particularly if there are historic structures on or near the park environs.

Built-environment awareness and preservation education are among the easiest subjects to include in any class (or park interpretive activity) because they require no text other than the community, and their inclusion can enliven almost any existing learning materials. Many states require that state and local history be taught in third or fourth grades and again in seventh or eighth grades. What a natural pathway to understanding concepts of preservation! A study of local history—whether done in school or at a park site—reveals the growth of an area, and with an understanding of the past one can begin to make decisions about the future. Archaeology, architecture, and local history all contribute valuable insights into a community's past.

Publication of the book *Roots* and its subsequent television production have prompted much study of family history. By gaining an understanding of one's own past, a child can soon make the transition to understanding that of his community. Just as a family grows and is shaped by outside forces, so is a city. Drawing a personal time-line is often a preliminary activity to give a child a sense of time and place.

Cemeteries are a rich resource providing a variety of activities. In Coldwater, Michigan, eighth grade students logged about 50,000 work hours studying the population growth of their town gathering data from interment records and cemetery markers. In urban areas, cemeteries are microcosms of the natural environment, giving students an opportunity to study local flora and fauna. In Gloucester, Massachusetts, high school students can take an elective course in cemetery restoration, and in Eagle Grove, Iowa, 5th and 6th grade students used the cemetery as an inspiration for creative letter-writing.

Cemeteries are rich resources for a variety of activities.

National Park Service

Staff members from the City Room of the San Francisco Public Library take children on neighborhood tours to discover Victorian building details.

Bruce Rhevs

Teaching Children to See

To gain an appreciation for the built environment children must be taught to see. All too often downtown is an area one must pass through to get somewhere else; children and adults alike simply do not notice their surroundings. To overcome this anesthetized state we live in, walking tours and downtown discovery tours concentrate on themes and details. The Birmingham Historical Society has taken students on terra cotta detail hunts and cast-iron hunts. Armed with magnets children can make their own discoveries. One of the activities Richard Balaban suggests in *The Mystery Tour* is a blind walk in which participants are forced to use senses other than sight to discover their surroundings. They can study roof lines, window treatments, manhole covers, building materials, chimney shapes, cornices, cast-iron fences, or whatever details may be available.

A teacher could probably teach all the required objectives of any given year using Main Street as the text. In Philadelphia, students use streets as an extension of their math and reading classes. They measure windows, calculate the area and perimeter of doors, count fireplugs, write poetry about the smells and sounds of a street, and even plant flowers in flower boxes. In Chicago, students carry meter tapes with them on all field trips for measuring practice. Moss and lichen growing in cracks of buildings are study material for science classes. Geology classes can examine building material and possibly discover local quarries. An art class can study texture by doing rubbings of bricks, sewer lids, signs, and plaques.

As a resource for creative writing exercises, a community Main Street or cluster of park buildings is unequaled. W. Ron Jones, in *your city has been kidnapped*, suggests that you pretend to be a building. "Do birds like you? Do you show your age? Do you get sunshine? Do you block people's view? Could your architect have done a better job?" In Cambridge, Massachusetts, students at the Fayerweather Street School have produced "A Close-up of Huron Avenue," a compilation of maps, photographs, and interviews of a 300 foot (9,000 cm) area of that street.

Preservation is a decision-making process which is not generally taught in the elementary and secondary schools. Children do not possess the skills necessary to restore a building, but that should not preclude them from making suggestions for its possible future use. What happens to a building or neighborhood can be as important to a child as it is to an adult. Game simulations are an effective learning device whereby students can assume different roles—perhaps a landlord, a tenant, a mayor, a commercial developer, the president of the historical society, and so on.

For her masters thesis project in historic preservation at Columbia University, Kathryn Spiegelman taught a course in neighborhood conservation for elementary school students. For their final project the students had to plan a reuse of an underutilized auditorium in their school. They were told what issues to consider and were given a floor plan of the space prior to constructing models of their proposals.

The real purpose behind sensitizing children to their environment now—whether done by schools or other organizations such as parks—is the hope that enlightened citizens will prevent future rampant destruction of buildings and neighborhoods. It is to that end that the National Trust is seeking to act as a clearinghouse of information for teachers and organizations concerned with the preservation of the built environment.

Pamela Caldwell is an elementary school teacher and a consultant to the National Trust for Historic Preservation. For further information about this search for Preservation Programs, contact the Trust at 740 Jackson Place, NW, Washington, DC 20006.

Extending Networks from Park to City

by Sam Holmes

Gateway National Recreation Area

Gateway conducts a community gardening program jointly with Cooperative Extension-Cornell University.

Problem. With a staff of only seven permanent interpreters, how should a National Park unit make its services available to a nearby population of twenty million?

That was the question faced by Gateway National Recreation Area in 1974, when most of its 26,000 acres (10,400 ha) were opened to the vast public which lives in the New York-New Jersey metropolitan region. The problem was complicated by the fact that most of the four units of Gateway are widely separated from each other and by the fact that operating funds were very tight.

For our three New York City areas, it seemed obvious to us that the most economical way to use our staff—at least in the beginning—was to deal as much as possible with organized groups. We reasoned that if we tried beating the drum to attract the general public, we might either get *too much* response (Suppose 500 people showed up for a beach walk!) or too little.

We did, of course, provide some interpretive and recreational services for the general public. But we decided to use the New York City schools as our main point of focus for interpretive programs. There are 1,100,000 children in the New York City public schools and more than 300,000 in the non-public schools.

Cooperative Programming Maximizes Gateway's Impact

After meeting with the Chancellor of the New York City Board of Education, we began planning a pilot series of seven workshops—called "Discover Gateway"—for teachers. Rather than trying to teach all these workshops ourselves, we got the help of a number of community and environmental organizations which had more experience in our environment than we did.

To get workshop leaders in marine science we worked with the New York Aquarium, Wave Hill Environmental Study Center, and two New York City high schools—Beach Channel and John Dewey. The Council on the Environment and the Environmental Action Coalition prepared teaching materials for us on "Solid Waste at the Beach." The Parks Council presented the workshop on the Jamaica Bay Wildlife Refuge, and Queens Botanical Gardens taught tree planting.

By working with these outside organizations we not only brought expertise into the park, but began establishing a network of friendly relationships which has been important to Gateway ever since.

From the beginning it seemed clear to us that the park's programs would not be very effective if we tried to be self-contained or pretended that we could take on the whole of the environmental education load of New York City. To be effective we needed to operate as part of larger systems.

For instance, there's no way we can serve *all* of the city classes studying marine life. We just don't have the staff. We can, however, be a useful part of the marine science system, in which other organizations use other New York City marine resources. Whatever we can do to encourage the school use of non-Gateway beaches for field trips also helps to strengthen the system. Therefore we have been members of the Marine Science Educators Association and have served on the Sea Grant Advisory Board. In the same way, we can be members of the camping network and the community gardening network.

Response to our pilot workshop series was excellent. Ninety-three teachers signed up. Soon we had opportunities to build relationships with other environmental education organizations.

Building an Environmental Education "Network"

One major chance came through the efforts of a lively, dedicated man, Dr. Eugene Ezersky, who was appointed as key-person to Gateway by the city Board of Education. Ezersky asked us to join him and several others in planning a three-day city-wide conference for leaders in environmental education. Out of this conference, held at Mohonk, New York, came the Environmental Education Advisory Council, composed of leaders of about 40 organizations. This has put us on a first-name basis with the directors of nature centers and environmental programs all over the city. We meet regularly to exchange information; we work together to present joint teacher workshops; and when there's an event like "World Environment Day" or "Sun Day," we put up our exhibits together under a big brown and white EEAC banner.

Gateway National Recreation Area

Teacher workshops on energy—conducted jointly by Gateway and New York City Board of Education, with the help of Private School teacher George Takeda—demonstrate how to build "Instant Solar Collectors" from cast-off materials.

Dr. Ezersky also helped Gateway to plan and implement a Cooperative Agreement and five-year special use permit with the Board of Education which resulted in the 6,500 square foot (585 m²) Gateway Environmental Education Study Center at Floyd Bennett Field in Brooklyn.

The Board now provides the assistance of an enthusiastic coordinator, Bernard Kirschenbaum, of the Center for Health and Physical Education, Division of Educational Planning and Support, and a fine teacher, Ruth Eilenberg. They help plan school programs, present teacher workshops, and create a catalog each fall and spring which the Board sends to every school in New York City. Working with Gateway the Center has created a small museum, a library of books and films, and a stockpile of camping equipment which school classes may use at Gateway.

"The American Gateway" and "Operation Explore"

The network principle gave us another good boost in 1976, when we presented, as a bicentennial program, "The American Gateway," a series of ten interpretive boat trips to the park from Manhattan and Hoboken. The Park Council, the New York City Planning Commission, and the State Park and Recreation Commission for New York City helped us to plan the trips and to bring community groups to and from the boat docks.

This program worked out so well that the State Park and Recreation Commission invited us to submit a proposal for another program, for which the Commission would pay transportation costs. We got together with Cornell University–Cooperative Extension, of which Dr. Ezersky had become New York City director, and worked out a program called "Operation Explore," which brings school classes to farms, state parks, and Gateway beaches. The children learn how the food chain works in each environment. This program provided some 8,750 student trips in 15 school districts during its first year; during the coming school year, it will serve all 32 of New York City's school districts with a total of 11,200 student trips.

This is still a micro-program in comparison to the size of the school population, but we think it can grow if it creates and makes use of a network of facilities.

Other Cooperative Ventures

Another cooperative effort which has helped Gateway is our gardening program with Cornell University–Cooperative Extension. Ranger Fred Szarka began our community gardening program in 1976, and when Cornell joined us in 1977 it brought an irrigation system and an increased capability to offer workshops, school classes, and gardening advice. Cornell maintains a two-person office at the Gateway Environmental Study Center and this year is helping us to build two solar greenhouses and to present a City Gardeners' Harvest Fair.

Yet another cooperative venture is the Umbrella Program in Staten Island. The city Board of Education provides a teacher, buses, and materials for this program, designed to improve children's reading through the motivation of outdoor natural science explorations.

Gateway has had other cooperative educational efforts, generally in the form of special use permits, at its Sandy Hook (NJ) Unit, with Brookdale Community College, the Marine Sciences Consortium, Sea Ventures, and the Sandy Hook Arts Focus on Talent.

Pros and Cons of the Network Approach

There is nothing startlingly new of course about Gateway's network efforts. Many of our ideas and contacts came from Sandy Walter's earlier TREE program (the Resource Center for Environmental Education) at Federal Hall, for which we were most grateful. The essence of the network idea is really just the decision to use cooperation with others to stretch your own resources and to work toward common goals.

There are, naturally, problems inherent in cooperative programming and networking. They require attendance at an awful lot of meetings, and service on committees, some of which are not directly or immediately useful to your own park. They require coordination—and patience when coordination breaks down, as it always does at times. They require a lot of extra communication *within* the park; we know we must learn to do this better than we have in the past. They also require a willingness *not* to be always the big cheese, a willingness to share publicity and recognition.

The possibilities of cooperative programming, however, are enormous. There are opportunities for development in many directions other than education that can produce good programs for the general public and particular interest groups, programs in the arts, crafts, humanities, and sports. We look forward to more of this kind of development at Gateway.

Sam Holmes is Chief Interpreter at Gateway National Recreation Area (NY, NJ).

Teaching the Land Ethic

by Tamra Peters

Student Stewardship Program

Elliott couldn't see the trees for the forest. The forest made up the park. While Elliott, his parents, and neighbors were all familiar with the park's darker side—weekend tourists, the resulting increase in pollution and litter, and the general disruption—they didn't know the real importance of the park and its protected natural system. A bright high school student, Elliott was more familiar with the park's overflowing trash barrels that he passed on the way to the school bus stop than with the natural life of the park itself.

Elliott's experiences are not isolated. The scene is repeated on the outskirts of parks, wildlife refuges, and nature preserves across the nation. In hopes of providing Elliott, his schoolmates, and their community with insight into the natural land, The Nature Conservancy, working with the Institute for Environmental Education, has come up with an experiment called the Student Stewardship Program.

It appears to be working. It could be a first step in bridging the gap between the community's present perception of parks and a new awareness that man is dependent upon and a part of all natural systems. This awareness leads to a land ethic.

The Student Stewardship Program enlists students, teachers, and local community residents as allies in the stewardship and protection of land. The program uses a natural area or park as an outdoor classroom where students collect data.

Students learn best when they feel their work is important. Participants in the Student Stewardship Program know the data they collect can be used to monitor the impact of use on the land and to record changes in vegetation and wildlife, such as hickory trees, once numerous, disappearing from a forest. With firm data, students can then work with the owners of the land to uncover the roots of a problem. By reporting adverse uses and illegal activities to the land owning agency, students act as stewards to help protect the natural area.

For instance, in Independence (OH), a 38-acre (15.4 ha) preserve owned by The Nature Conservancy existed relatively unnoticed until students participating in the Student Stewardship Program talked to local residents about the Conservancy and the preserve. They found that people were dumping refuse along one of the preserve's boundaries.

But once the preserve's neighbors realized the importance of the area through the students' letters, and knew that the students would be using and monitoring the area, the dumping ceased. In the fall, students saw illegal hunting on the preserve and quickly took action by arranging for the local game protector to patrol the preserve as part of his regular rounds.

Adaptable to All Land Areas and Agencies

Designed for responsible students from high school through college, the Student Stewardship Program can be carried out on almost any type of land throughout the country. The selection of activities permits the program's use by park and nature center personnel as well as teachers.

Students invite parents, park neighbors, personnel from the Soil Conservation Service and State Department of Conservation, members from the Audubon Society, and others to participate in the program activities. These people are invited to a mid-year meeting to hear students report on their investigations.

A quote from an Ohio student's report reveals a developing land ethic. "It is not easy to include and connect a 70-year-old local historian, a county recorder, and a superintendent of public schools for one common goal—the preservation of a piece of land that has been sitting around unnoticed for years. And then to stand up in front of 60 people and try to make them feel your excitement and recognize the effort that went into discovering a stream that moves too quickly to sustain much life, or the occurrence of a solitary grove of Paw-Paws . . . .But it is a fantastic learning experience that I hope will continue long after we are gone."

For The Nature Conservancy, the Student Stewardship Program is extremely important. The Conservancy, now in its 27th year and America's largest private land conservation organization, continues to grow and to protect natural areas. As a national, non-profit organization, the Conservancy is committed to the preservation of natural diversity and has protected more than 1.3 million acres (526,110 ha) of ecologically priceless habitat—forests, prairies, mountains, and islands. The Conservancy has acquired more than 1,300 nature preserves in wilderness, rural, and suburban settings throughout the country; and it still owns and protects some 600 of them.

Realizing that education is the key to future stewardship and protection of natural areas, and that each Conservancy preserve is a potential resource for nearby educational institutions, the Conservancy, at the end of 1976, requested and received grants from the Cleveland and George Gund Foundations to develop an environmental education program. A program that would teach students about the interconnection of all

Tom Offutt

Students collect macro-invertebrates from a stream to measure water quality.

life and, at the same time, foster an understanding about the importance of protecting natural areas. Perhaps the most challenging task was to design a program suitable for different types of preserves located in different settings. For example, what activities would you do on a 30,000-acre (12,000 ha) desert preserve that also would be appropriate on a ½ acre (.2 ha) island off the coast of Maine?

Program Format

The Student Stewardship Program is divided into three parts—fall, winter, and spring activities. In the first year of the program, students conduct a series of necessary preliminary activities—gathering names and addresses of resource people, looking for historical information, setting up study plots, etc. In the following years, students conduct the same basic investigations plus a comprehensive study in a special area of interest—such as tree rings and weather history, or how surrounding land uses impact on an area.

Since seasons and weather patterns differ around the country, the sequence of some investigations can be changed. In fact, some activities, such as water investigations, may not apply to certain areas, such as desert preserves.

At the end of each school year, students prepare a summary report of the data gathered during the year and submit the report to the teacher and the land management agency. The data submitted over a period of years provide a wealth of useful information to help with management decisions about a park or preserve.

Part I of the Student Stewardship Program has eleven activities. From these, students choose those activities applicable to their particular locale.

Activity 1–Getting Acquainted. Students get introduced to the program's equipment and activities.

Activity 2–Using a Topographic Map. Students learn to interpret and work with a topo map of the preserve they are studying; they calculate the latitude and longitude of a given point.

Activity 3–Making a Slope and Watershed Map. During this investigation, students make an enlargement of the topo map and transfer information from it to make a slope and watershed map. Students discover some interesting facts from the map before their first visit to the preserve, such as whether it will be easy terrain or a steep climb. Slope and watershed maps show which areas of the preserve are most fragile and should be avoided, such as bogs or steep ravines.

Activity 4–Reading a Deed. Students become familiar with the language and symbols used in deeds and survey maps and study the history of the preserve. In addition, they learn how to find the compass headings needed to pace off preserve boundaries.

Activity 5–Drawing a Preserve Base Map. Students make a large-scale base map to be used for future activities to record the location of study areas and significant features of the site, such as ruins of an old building or Indian burial mounds.

Activity 6–Doing a Pace and Compass Traverse. New orienteering skills are tested as students walk a traverse across the preserve, stopping along the way to record their first impressions of the preserve's plants and animals. If they pass the test, the next task is to walk the preserve's boundaries by converting the deed description into orienteering headings and distances.

Activity 7–Establishing a Photo-Point Monitoring Station. Students locate a site at each major vegetation community type on the preserve and take photographs in the fall, winter, and spring. This information, provided year after year, becomes a reliable way to document changes in an area—which species are becoming more numerous, which are dying out, etc.

Activity 8–Using a Key. Learning to identify species of trees, using a field guide key, aids students in later identification of wildflowers, animal tracks, and shrubs.

Activity 9–Vegetative Sampling by Quadrat. Students begin their first data collection, setting up quadrats at key sampling sites. They map trees in the quadrat by species, location, and diameter breast height. The information collected in the sample quadrats is a key to predicting the characteristic trees for the whole preserve.

Activity 10–Vegetative Analysis. Preparing mathematical computations of frequency, density and relative density, relative dominance and importance value of each species, gives students a quantitative view of the plant communities found at the preserve.

Activity 11–Preparing a Stand Table. By comparing stand tables developed for each different species of tree, students eventually can get an overview of whether a species or entire community type is doing well, dying off, or just coming into an area.

Winter Activities

Winter activities include a selection of eight investigations which require less time to be spent out-of-doors.

Activity 1–Geologic Mapping. Students learn to deduce the nature of underlying geologic formations from indirect evidence such as fault lines found on topographic maps.

Activity 2–Gathering and Mapping Geologic Field Data. By gathering field data from rock outcrops, students make a geologic column and draw a geologic map of the preserve.

Activity 3–Investigating Temperature Fields. Students discover that the atmosphere around them is an expansive field of moving and changing temperature—a three-dimensional space filled with air

Tom Offutt

Regular measurements and analyses of trees and vegetative covering provide useful data for the preserve's land owner.

currents and sinks. Readings of temperature at different levels and at different sites are taken. Students relate this information to the concept of micro-climate where different vegetation occurs.

Activity 4–The Preserve's Precipitation. By monitoring amounts of precipitation on the preserve and testing for the acid content, students become aware of the causes and effects of small local variations in weather. They also begin to see the ecosystem of the preserve as a "holistic" unit. For example, a factory's pollution many miles away can effect the soil's ability to support plant life.

Activity 5–Locating Community Resources. Students interview neighbors living around the park or preserve and explain to them why the preserve is important. In addition, they try to find out more about the area's history and character—anything the neighbors can share with them.

Activity 6–Special Projects. This is a free activity for students to choose something of interest to them. Suggestions include: preparing a preserve brochure, locating previous research done on the preserve, studying how changes in land use around the preserve effect its vegetation and wildlife, etc.

Activity 7–Mid-Year Stewardship Meeting. Students plan a meeting with other nearby schools (if any are participating in the program), neighbors, parents, and other citizens. They present what they have learned so far. At one school, members of the press were invited to attend the meeting.

Activity 8–Retracing Your Steps. Students take winter photos at the same sites they photographed in the fall. Then they return to the quadrat study areas and try to identify the same trees, using twig characteristics.

Two other optional activities are: *Searching for "Big Foot"*—which includes looking for signs of wildlife by animal tracks and other clues; and *Tree Rings and Weather History*—where students discover the direct influence of climate and microclimate on tree growth.

Spring Activities

In the Spring, teachers have ten activities to choose from. What better way to enjoy and appreciate the spring than to study it in an outdoor classroom!

Activity 1–Soil Analysis. Students conduct tests including soil percolation, soil porosity, water retention, and soil texture. The tests are important to an understanding of the hydrologic cycle.

Activity 2–Organisms as Indicators of Water Quality in Streams. Students collect macro-invertebrates that cling to rocks in streams and do a biotic index. The variety and kinds of organisms living in a stream are a good clue to the quality of the water.

Activity 3–Suspended Solids and the Graded Stream. Students measure effects that the quantity of sediments have on a stream's energy expenditure—its speed of flow, clarity, and the life supported by it.

Activity 4–Population and Behavior Studies of Birds. Members of the local Audubon Society can be called on to help students observe and identify different species of birds, noting their habitat and characteristics.

Activity 5–Mark and Recapture Techniques of Estimating Population Size. Students collect and mark species of insects, such as grasshoppers, to determine population size. This same exercise may be carried out with small mammals.

Activity 6–Succession in a Rotting Log. Study of micro-succession in the various stages enables students to better understand the principles of succession.

Activity 7–Observing Nocturnal Activities. Students observe different night animals found at the preserve. They learn that some animals take advantage of the same resources but at night. This allows different animals to coexist in the same habitat.

Activity 8–An Inventory of Spring Wildflowers. The different wildflowers are identified and catalogued as new species emerge each week.

Activity 9–Completing the Vegetative Sampling and Photo Point Monitoring. Returning to the previous study sites, students do "nested" quadrat studies of saplings, shrubs, and herbaceous plants. They compute total species cover and relative cover. Then they take the final photos.

Activity 10–Final Report. A summary of all the year's investigations is prepared and submitted to the land owning agency and to the teacher. The data, over time, can be extremely useful to the land owner since each year's data build on the work of students in earlier years.

Building A Land Ethic

The Student Stewardship Program is unique and important. As America's leisure time increases, creating more demand for use of parks and preserves, the information that students can provide will become increasingly valuable.

But perhaps more important is the understanding and land ethic that the program can give to students like Elliott. For today's students are the key to the future protection and stewardship of America's preserves and parks. A quote from T. S. Eliot sums up the Student Stewardship Program very well—"The end of all our exploring will be to arrive where we started and to know the place for the first time."

Ms. Tamra Peters is Director of Volunteer Programs at The Nature Conservancy. Requests for further details about the Student Stewardship Program should be directed to Ms. Peters, The Nature Conservancy, 1800 North Kent Street, Arlington, VA 22209.

Bare Bones to Nicely Muscled Environmental Education

by Audrey Dixon and Stan Lock

When we begin to think about developing an environmental education program in our park, or to re-think the one we already have, we should first step back from the scene and take a hard look at the park's existing parameters for incorporating environmental education: the organizational framework of interpretation, the traditional message-telling arm of the National Park Service (NPS) and most other park agencies.

Within each park's total program of interpretation, there is one basic overriding given: every interpretive activity must relate to the park's interpretive themes. These themes have been selected because they best represent the event(s), person, unique natural phenomena, or cultural attributes associated with the particular site. In essence, these themes bespeak the park's *raison d'etre*.

Interpretation, in any of its forms, is the bridge between the park's staff members— who most often know somewhat more about their park's events and phenomena—and the visitors, who more often know somewhat less about these things. Therefore, interpreters should always use the park's theme as the girders upon which their "bridge" is built.

Enter Environmental Education

At a time when interpretation had slipped in importance within the National Park System's hierarchy of priorities, along came environmental education. This was about a decade ago. Interpretive personnel were called upon to carry out the mission of environmental education as well as that of "regular" interpretation. Unfortunately, as is often the case with new programs on which top management wishes to place emphasis, environmental education was kept essentially separate from most parks' ongoing interpretive programs. It was kept apart for two basic reasons: lack of understanding of the need for it to be an integral part of the whole, and the better to have the finger point in proud or unhappy identification: "*That's* part of our Environmental Education Program!"

Interpretation and environmental education became the two sides of a coin. In some parks the sides were, in fact, on different coins.

National Park Service

Environmental education messages might point out the impact of a river on creating canyons.

At that time interpretation was seen primarily as a program of activities which conveyed messages based on the theme of the park to transient park visitors. Environmental education, on the other hand, was viewed as an external or specialized set of add-on programs developed for groups visiting from nearby communities, most often young students from neighboring schools.

In a number of parks, interpretation still is thought of in terms of theme related programs for the park visitors, and overall environmental education activities in terms of programs for formal education and special interest groups.

The Inevitable Marriage

A recent marriage of the two views as to pertinent messages and prospective audiences, however, has taken place in a number of new interpretive programs: environmental education has merged with park theme messages and vice versa, and thereby made both more relevant to all park visitors.

Through its merger with environmental education's philosophy and substantive content, interpretation itself grew in depth and breadth. Interpretation thus broadened (as in all cases of maturing) became able to perceive and, in turn, could convey a better perspective of the whole at any park where the joining of the two views had occurred. The joining also gave interpreters a wider scope of understanding that enabled them to raise the level of visitors' understanding. Thus, the union helps both interpreters and visitors think more holistically.

What Environmental Education Is . . .

Before we discuss planning an environmental education program—a program with a holistic approach—to be presented to a live audience, perhaps it would be best to state the definition of environmental education used by the NPS:

Environmental education is the process of learning and teaching at the conscious level, that people—in addition to influencing and being influenced by cultural systems—are fully participating and interacting parts of the Earth's natural systems, and are as subject to all natural laws and their endless interactions as any other organisms.

Environmental education uses as its substantive content the concepts and most highly validated facts of all disciplines, but only when these are taught and learned within a context of the overriding fact that any single action an individual takes has an uncountable number of impacts.

What Environmental Education Is Not . . .

To confirm our understanding of what environmental education is, it might be helpful to consider now an example of what it is not.

While it might be fun to learn in one of our big western parks that Douglas fir cones look like so many mousetraps with little mice legs and tails sticking out . . . and that Douglas fir trees are not true firs at all but false hemlocks as their

National Park Service

Lighthouses furnish good examples of man interacting with his environment.

National Park Service

Natural forces of wind and weather—and man's interrelationships with them—make for fascinating environmental education.

generic name (Pseudotsuga) indicates . . . and that there are a number of inhabitants in these trees' limbs and trunks . . . and so on . . . this kind of information dissemination does not constitute environmental education.

Even should we discuss the whole tree, we would not be practicing environmental education. To discuss the tree's history, its relationship to park flora and fauna, the watershed, climate zones, and humans would be to approach gaining a perspective of the whole for that site, and, therefore would be near the point where the message could be identified as environmental education.

Bare Boned Environmental Education

When any set of activities and its verbal content, or program consisting only of verbal messages, has been planned to meet the definition given above, it qualifies to be called environmental education, no matter what one would have labelled the program heretofore—a science, conservation, or outdoor education program. We think that a bare boned environmental education program is one which barely meets the criteria as stated in the definition, and has only a limited kind of audience, perhaps only school groups.

Note that the qualifications for a program to really be environmental education do not deal with methodology—the techniques for getting across the content of environmental education—except by implication that the *thinking* part of the people must be involved.

This is contrary to one widely held view which we might call the "One-with-Nature" or "One-with-Culture" approach. In this approach, the program uses a number of activities to deal with any *one* aspect of the natural or human-built environment at a time, and employs the technique of stimulating affective (feeling) rather than cognitive (knowing) responses, or merely heightened physiological responses in its participants.

An example of this is the much used blindfold activity which is part of "Trust Walk" and "Get To Know Your Rock." Unfortunately, the same end can be achieved by focussing on various tactile sense organs while sitting at a bar drinking two beers blindfolded, then trying to distinguish between three different liquids—cola, non-cola, and ginger ale—in three glasses the bartender has set before you. Both blindfold processes may be fun and even enlivening, but they don't qualify as environmental education, not even of the bare boned variety.

And we do know about the learning of the right side of our brains in contrast to the left side, and of the values of the mode of receptivity as a valid process for expanding our fields of awareness. We still hold to our view.

We are quick to add, however, that an interpreter who uses a string of various exercises related to specific academic disciplines and, therefore, inevitably deals with cognitive materials, does not automatically ensure that he/she is practicing environmental education either—even if all the exercises are conducted outdoors. Measuring a stream, discovering what's in a rotting log, pacing off an acre, or getting from point "A" to point "X" through orienteering, etc. are all education. All are also great fun. But we would have to ask, "Has the level of learning changed from what it would have been if a science class went through these same paces?" If it hasn't, and if the criteria for environmental education as given in the definition have not been met, then the mere adding of more outdoor, scientific, math, or whatever kind of activities, hasn't caused nature education to vault itself to the plateau of environmental education.

Of themselves, or even when strung together, such activities do not constitute environmental education, but awareness activities. Yet blindfold walks and orienteering can flow into and become excellent tools for environmental education. The addition of pertinent ecological concepts to these awareness activities can stimulate the learners' thinking mode during the activity, and the whole of the walk plus the talk will more likely have the desired effect of being carried over to the learners' home/school/job lives.

Bring In the Muscles

Moving from the realm of nature education to environmental education is quite an achievement. Both fields require

Enlightened energy management might include using more efficient modes of transportation within parks—and explaining why to visitors.

National Park Service

Historic structures can provide starting points for good environmental education.

interpreters to possess sensitivity to people, the surroundings, and the content of their intended messages. One of the turning points in moving from the former to the latter is having the ability to recognize the needed applicability of the concepts and information to today's lifestyles and the behaviors within them.

The Anasazi, or Ancient Ones, who once inhabited the lands in and around what we now call Mesa Verde National Park, in Colorado, never went on trust walks or orienteering exercises. They might have played games blindfolded, but not in order to gain more sensitivity to their environment along the cliffs. Their sensitivity came from intimate relationships with the land and its products, the weather, and their time-absorbing efforts to survive because and in spite of the two. There were almost no layers of middle men between them and their food, homes, and clothes. The specializations of labor that did occur were observed firsthand by all.

Mesa Verde National Park is an excellent place for interpreters to convey messages relating to the interplay of natural and cultural systems—not only to school groups in a program labelled "Environmental Education," but through interpretive messages throughout the park to all groups of people. A school or even graduate group may study and infer the many components and interrelationships within the natural and cultural systems in that park and how these impacted on each other during the centuries the Anasazi lived there, up to the time of their departure from the territory. Questions naturally will be raised: Could it have been overuse of their once bountiful fuel and building resource, timber, that influenced them to move on? Could it have been the development of superior technology in warring by some antagonistic tribes, or demise of the economic value of the goods they used for bartering that sped them away from these high plateaus and the cliff dwellings in which they performed all the governmental, religious, social, and other functions seen in most societies?

Superintendent Ron Switzer, elsewhere in this publication, cites more particulars of this earlier Mesa Verde culture and how his staff uses the story line of the Anasazi to get across the interactions of natural and people-built systems, and to project those interplays into the interacting systems of today's Mesa Verde.

Similarly, we might ask, "What happened in the Great Plains of the U.S.A. during the Dust Bowl Era, or in Russia in the 1960s regarding the wheat harvests? How does farming affect *our* lifestyles, the health and wealth of nations, even to the point of war? If we agree with Abraham Maslow's statement of a hierarchy of needs, we remember that the basic needs of people for food and shelter must be met before the higher needs that call forth complex social systems will come into being.

Our environmental education messages might point out the significance of the terrain in battles—as with Little Round Top and the acres of open fields beneath Cemetery Ridge at Gettysburg National Military Park (PA); or the impact of a river on creating canyons, or on making a site a good place to live, build a town, or expand an industry. And, always, we must include man's influence on these natural forces, and vice versa.

Life of the patriots during the Revolutionary War era can be more fully appreciated by those who participate in activities that take them beyond a battle at a particular site. Answering the questions of how the men and women who became the soldiers and providers there lived, worked, and played become focal points for educational processes to flow at Minute Man National Historical Park in Concord (MA), or elsewhere.

The interactions and interdependencies of tradesmen and the highly skilled, specialized craftsmen and artisans in the milieu of *their* contemporary society with its political unrest, come alive to those who learn through the park-developed "Community History Explorer's Kit" at Minute Man.

National Park Service

National Park Service

Too often, environmental education has been kept essentially separate from most parks' ongoing interpretive programs.

We can add muscle to our more specialized environmental education efforts by using the techniques of the Environmental Living Program and of the National Environmental Study Areas (NESAs), where interested groups—be they young students, clubs of senior citizens, or a banded group of former coffee klatch housewives—can master the complex interweaving of ecological and societal concepts as they might master the plays for 3-D Tic Tac Toe.

Impact of Environmental Education on the Park

Developing muscle in the environmental education outlook of a park can have a startling impact on the park itself.

Recently, we have moved from the idea that parks exist as isolated islands, in some cases with what we believed to be extensive buffer zones to protect their cores from "outside" influences. The recognition that parks have interrelationships and interdependencies with nearby communities, and in some cases even with international communities, has been slow in arriving. But with its coming, our ideas of ownership, stewardship, and responsibilities have changed.

Environmental messages by parks' management teams, messages which may or may not be directly drawn from the story of a park as in the case of the Anasazi, may only be saying, "Be more efficient with what you have." Park employees indicate by their individual actions what *their* attitudes and convictions are, as well as those mandated by their supervisors.

Environmental education information and concepts, especially now that these include our best understandings of our energy systems, may impact upon such park maintenance decisions as whether or not to mow the grass. Environmental education may also enter into more complex management decisions—such as whether or not to plant certain species of flowers; whether or not to replace some modes of transportation with more efficient ones; whether to eliminate certain tours altogether; whether or not to place water conservation signs around the park; or whether to simply arrest violators or try to educate the public after a number of illegal hardshell fish poachings.

Environmental education concepts can have an uncountable number of influences upon the once-in-a-while visitor, as well as on those extensive park users, park employees. Once the knowledge and conceptual framework involved in environmental education is internalized by an individual, the transference by that individual to other areas of his/her life can have a multitude of positive results. These, in turn, will refine that individual's total system of attitudes, values, and ethics. This educational process, begun in a park, is likely to continue growing and flowing through interpretive and management programs out into a continual, mutually supportive set of relationships between parks and communities.

We realize that to speak of the conceptual whole it is necessary first to deal with individual parts and their almost innumerable interactions *within* particular systems. But for environmental education to get beyond the bare bones stage of involvement with only the formal educational sectors (and those usually at the early grade levels) of park communities, it must extend itself and overflow into and through all park frameworks—regular interpretation, maintenance, and management—and then into that intricate network of groups—industrial, leisure, family, and all others—found beyond the parks' legally defined boundaries.

In short, environmental education can affect all of us. It can help us determine our messages and programs inside our parks, make decisions about running our parks, and even influence how we live away from our jobs, by lifting our views and widening our perspectives as well as those of our visiting publics.

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A New Frontier for TVA

by John R. Paulk

The Tennessee Valley Authority (TVA) is unique among federal agencies. Established in 1933 as an independent, government-owned corporation, it was "charged with the broadest duty of planning for the proper use, conservation, and development of the natural resources of the Tennessee River drainage basin and its adjoining territory."

TVA crossed traditional agency boundaries by assuming a total resource responsibility, rather than the development or protection of a single resource. For the first time, the interrelated parts of resource development were brought together in one program for a major region.

The challenge of regional planning and development began with the problem of economic development. The primarily rural area was inhabited by small farm families, and many of the hillside fields were depleted from years of row crop planting, erosion, and flooding. The average income among these farm families was $300. A key to the solution of the economic problems was development of the waterways and control of runoff throughout the Tennessee Valley.

TVA pioneered in building the first system of multiple-use dams and man-made lakes to control a river the size of the Tennessee. The flood control system was begun in the thirties and was escalated in the forties to meet wartime demands for hydroelectric power. This hydroelectric power, and the subsequent electricity produced by steam plants, was used to demonstrate that electricity, existent on one farm in thirty in 1933, could be made available to the general public at reasonable prices. Financing was made available for farmers to organize cooperative systems for power distribution in rural areas. TVA power was offered to these cooperatives and to city-owned electric systems at wholesale rates, with the provision that the savings would be passed on to the public. This low-cost electrical energy was to become a major tool for development of the Tennessee Valley.

TVA

This youth station at Land Between The Lakes is a resident facility for environmental education programs.

Roots of the TVA

TVA's original concept was fostered in the political and environmental realms of the Theodore Roosevelt administration at the turn of the century. It was the logical outcome of a long ferment of American thinking about the nation's resources and how to conserve and develop them.

Three hundred years of American settlement had been wasteful; resources were regarded as practically inexhaustible. President Theodore Roosevelt sparked the trend that led to the reversal of wastefulness. Gifford Pinchot, U. S. Forester, and W. J. "No Stop" McGee, anthropologist, geologist, and hydrologist, headed his conservation team.

Pinchot considered that his own speciality, forestry, was inseparably related to other natural resources—to stream and inland navigation, water power and flood control, soil and erosion, minerals, fish and game. He came up with a capsule idea that was expressed practically in the TVA Act many years later. All these, he concluded, were not separate problems; they "make up the one great central problem of the use of the earth for the good of man."

On May 18, 1933, President Franklin D. Roosevelt signed the TVA Act, formalizing an agency to examine a multitude of resources as interrelated factors, and to develop these resources with the thesis that humans are an inseparable part of the natural environment.

Evolution of EE Within TVA

With its birthright founded in a strong concern for the environment and the relation of man to and in that environment, with its multidisciplinary structure, and with its focus on a major region of the nation, the TVA identified the need for a broad-based educational program to promote and support these ideals. Environmental education thus evolved as a major program and new frontier for TVA.

The environmental education program of TVA seeks to share the expertise of the TVA staff in the development and implementation of local, state, and regional environmental education programs, and through such involvement, provide a model for regional development throughout the nation. TVA serves as a supportive resource for environmental education programs through provision of staff expertise, facility development, and selected demonstration activities throughout the Tennessee Valley.

From the valley-wide perspective of environmental education, two major program components evolved. One component, the Regional Environmental Education Development Project, would focus on the establishment of regional cooperatives and on programs with formal educational groups. The second component, the Regional Environmental Interpretive Development Project, would focus on the nonformal, interpretive programming aspects of environmental education.

Regional Cooperatives for Formal Environmental Education

As early as September 1969, TVA and 13 northwest Alabama school systems established the concept of a regional

Students conduct water quality experiments at the Nolichucky Environmental Education Project.

TVA

cooperative for environmental education. The result emerged early in 1972. As described to TVA's Board of Directors, "The purpose of the project is to introduce environmental education programming into the schools in the Bear Creek watershed, with professional leadership experienced in program planning and development."

TVA provided financial assistance for the first 16 months. Additional and subsequent funding was provided by the participating systems based on a fee per pupil and standard cost for membership. Additional funding was successfully solicited through the Environmental Education Act (P.L. 91-516) and local sources. The Bear Creek program is currently operative and has maintained its original staff. This early experiment with independent school systems organized into a cooperative for environmental education was to provide a successful model upon which TVA patterned one of its major program components.

Until the early seventies, TVA's environmental education program had been centered primarily in the Land Between The Lakes in western Kentucky and Tennessee. With the national impact of the environmental education movement, several divisions within the TVA structure were becoming involved in environmental education activities. To eliminate duplications of effort and to provide close coordination, a TVA Advisory Council for Environmental/Energy Education was formed. The membership consisted of division directors and staff with environmental education activities. This Advisory Council, which is still viable, reviews progress and addresses the need for additional program development on a periodic basis.

Assumptions of the TVA Approach

TVA has made some basic assumptions underlying its approach to environmental education.

1. Environmental education includes both formal and nonformal education.
2. Environmental education is a process-oriented approach, and is aimed at assisting the learner in becoming informed and in learning how to be effective in solving or preventing the full range of environmental problems.
3. Environmental education is interdisciplinary in approach.
4. Environmental education is aimed at motivating the individual to act upon his environmental concerns.
5. Environmental education is concerned about the social implications of environmental decisions.
6. Environmental education is directed toward helping individuals become knowledgeable concerning the total environment (natural and man-made) and associated problems (physical, social, economic, political, and cultural).
7. Environmental education is directed towards increasing the learner's interest in, awareness of, and sensitivity toward the environment.

The preceding delineation serves as a functional framework for environmental education as implemented by TVA. For more formal purposes, TVA endorses and utilizes the definition developed under the auspices of the U.S. Office of Education, Department of Health, Education, and Welfare, as expressed in the Environmental Education Act:

"Environmental education is the educational process dealing with man's relationship with his natural and man-made surroundings, and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment."

The Regional Environmental Education Development Project was designed for systematic development of a network of environmental education cooperatives throughout the Tennessee Valley region. Ultimately, this project will generate 12 to 15 cooperatives that will collectively span the valley. The geographical objective is to have at least one cooperative within 50 miles of any valley resident. National demonstration of the effectiveness of such an implementation will follow a pattern similar to the Bear Creek watershed cooperative and will draw heavily on the resources of the universities in the region.

Setting Up a Cooperative

In designated areas, university officials and superintendents of school systems are encouraged to agree to the implementation of environmental education on a high-priority basis. A description of the major program activities, plan for implementation, and plan for establishment of a self-sustaining cooperative are then prepared and presented to TVA. Once the plan is accepted, TVA and the cooperative enter into a letter of agreement which delineates the assistance to be provided by TVA and the time frame for implementation of programs by the cooperative. A full-time coordinator for environmental education is hired by the cooperative, based at the university, to implement the designated programs. Common program thrusts are teacher-training programs, school-site development activities, materials and resource identification and collection, and curriculum development in environmental education.

TVA's environmental education staff maintains liaison and provides supportive services. TVA land and facilities are also made available for use, and occasionally major construction or renovation of such facilities is made to accommodate the program.

Currently the Regional Environmental Education Development Project has generated cooperatives in northwest Alabama, upper east Tennessee, southeast Tennessee, northeast Mississippi, and west Kentucky. A network of 17 cooperatives, based at regional universities, is projected for 1985.

TVA

The renovated Nolichucky Powerhouse serves as an interpretive center for the Nolichucky Environmental Education Project.

Interpretive Component of TVA's Environmental Education Program

The Regional Environmental Interpretive Development Project was designed to generate programs for the nonformal component of TVA's environmental education program. TVA lands and facilities are visited by millions of people annually. Programs for these individuals range from traditional natural and historical interpretive activities to development of major sites for nonformal use. Examples include the renovation of a 1908 powerhouse into an interpretive facility emphasizing energy use, generating techniques, and conservation; a reproduction of an 1850 era farm, complete with structures, crops, and tenants; and extensive trail systems throughout the public-use lands and designated Small Wild Areas managed by TVA. Whenever possible, such activities are developed in conjunction with the organized cooperatives, thereby allowing use by formal and nonformal groups.

National Demonstration Area

In order to demonstrate the effectiveness of both the formal and interpretive aspects of environmental education, the Land Between The Lakes was developed by TVA as a national demonstration. Located on a 170,000 acre (68,000 ha) peninsula in west Kentucky and Tennessee, Land Between The Lakes is the area where visitors can observe environmental education in action.

Students can be observed in residential and day-use programs of environmental education with their teachers actively involved in the instruction. Teachers undergo an intensive training session prior to bringing groups to Land Between The Lakes and assume responsibility for program planning and implementation. TVA staff offers assistance and provides numerous resources. However, the teacher is the implementor and maintains the teaching role throughout the experience. Special facilities are demonstrated at Land Between The Lakes. Residential camps, day-use areas and facilities, educational farms, and historical reconstructions are among the many facilities used by the Land Between The Lakes' visitors. Outdoor recreation and resource management themes are also major demonstrations.

Validity of the Program

The current status of environmental education within TVA is one of growth. Valley-wide plans for implementation are being well received and the established facilities, such as Land Between The Lakes, continue to grow in use and popularity. The status within the structural framework is unique. The environmental education unit is charged with responsibilities that cross division lines, allowing for widespread involvement and utilization of TVA staff and resources. It is a program that is fundamental to the education of the valley populace through a valid educational process. It is this validity that protects the integrity of the program, prevents the environmental education effort from being interpreted as a public relations or propaganda ploy of a federal agency. A quality program in environmental education will reflect favorably on the agency; however, this benefit is considered secondary to the benefits to the valley populace. With the current level of activity and continued demonstrations of successful programming, the environmental education program of TVA will be assured of continued productivity.

Funding for TVA's Environmental Education

As with most federal agencies housing programs in environmental education, TVA annual budgets are congressionally appropriated. Appropriations are based on a wide range of criteria. Currently TVA's budget provides for nine professionals on the environmental education staff. Assisting these professionals, mostly in a facility support role, are twelve technical aides. Both facility support and development funds, as well as programmatic funds for such activities as the regional environmental education cooperatives, are also included in the budget for implementation of environmental education. Since TVA does not have a grant program for environmental education, the support activities requiring financial assistance are negotiated by contract.

Future Plans: University Network and Energy Education

In addition to the systematic expansion of the Regional Environmental Education Development network with public schools and the Regional Environmental Interpretive Development network on TVA lands and facilities, a third network is being implemented. The university cooperative network is composed of universities in each of the seven TVA states. TVA will assist each university in the establishment and staffing of regional centers for environmental education. The function of the centers will include: (a) preservice teaching training; (b) program development; (c)

research; and (d) assistance to regional cooperatives and similar environmental education efforts.

As one of the world's largest energy producers, TVA has numerous energy-related resources. These resources are effective tools for a major component of environmental education—energy education. The power production facilities offer many opportunities for exploration of energy themes such as energy conservation, energy production, and net energy systems, and they offer interesting comparisons to the natural energy systems. Alternative energy systems, including solar, biomass, and use of waste heat, present additional teaching and learning opportunities accessible through the energy network of TVA. With 160 electrical cooperatives, spaced throughout the seven-state region, the provision of information and promotion of educational programs is a joint partnership between the federal and local sectors. Special exhibits, sponsored by TVA, are provided to public schools throughout the valley offering energy demonstrations and presentations to a wide range of students. The current theme is "Energy Today and Tomorrow."

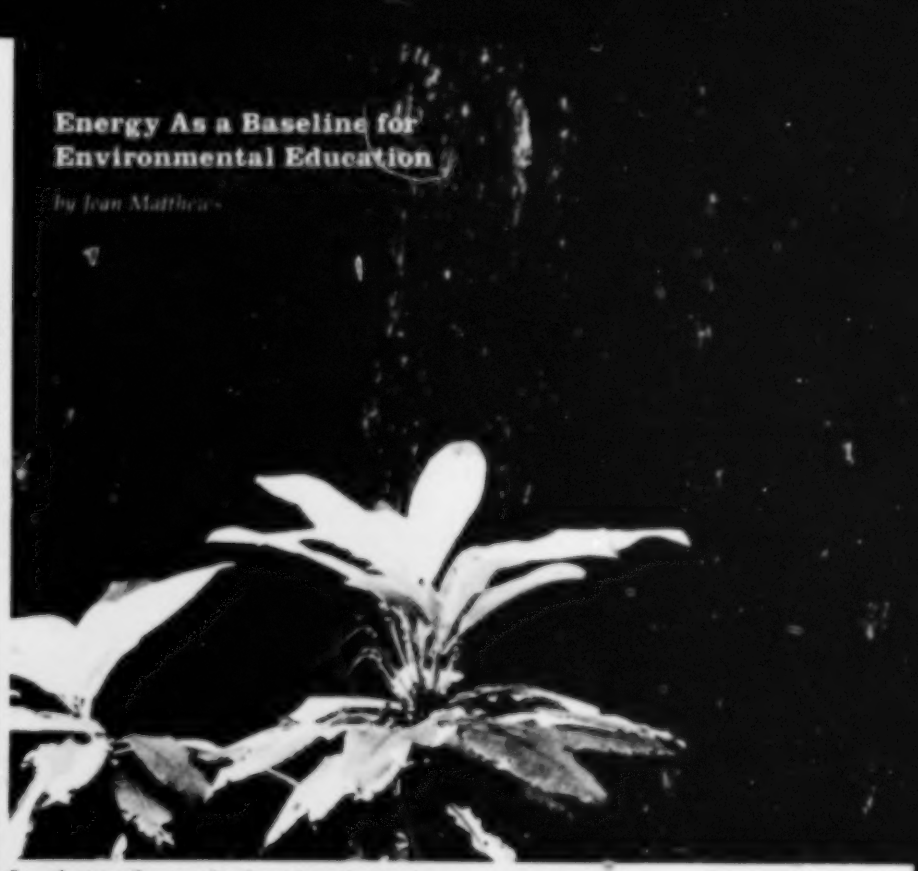
Plans are also underway for expansion of the energy education component of TVA's environmental education program. Identified for special emphasis are energy alternatives, special programs directed at energy audits of public schools, increased teacher-prepared supplemental materials, addition of demonstration sites at geographic locales across the valley, and expansion of services through the educational cooperative network. TVA will continue to work with the Federal Interagency Committee on Education, Subcommittee on Environmental Education, and Subcommittee on Energy and Education.

TVA has outlined an ambitious program. Hopefully the needs identified by Tennessee Valley educators can be met through a working partnership among all of the resource agencies in the region.

John R. Paulk is the Program Manager for the Tennessee Valley Authority's Environmental Education Program.

Energy As a Baseline for Environmental Education

by Jean Matthews



National Park Service

From the tiniest flower petal to the mightiest Sequoia, there is an energy story to tell.

Ten years ago, the world came to attention in front of its own first full-length portrait—taken from a rocket-based camera 23,000 miles (36,800 km) above the surface of a little round marble, framed against the black hostility of cold, empty space.

The shock of that portrait, coupled with mounting internal evidence of Earth's faltering life support systems, spawned a rash of responses, high among which was a movement calling itself "environmental education."

For 10 years the movement has sputtered along—looking for a home, picking up a constituency, trying to define itself, and design its proper mission.

In the course of this "shaking down" period, environmental education has been much admired and just as much abused. It has been over-praised as the salvation of the world of nature and over-damned as the subverter of the world's economy.

It has been both welcomed and shunned in the very same places—schools, parks, and the market place—but it is rarely ignored. Environmental education tends to trigger passions of support and of animosity. Both reactions are a clear signal that something vital, something of significant impact, is afoot here.

Two Worlds

Because "environment" is such a sweeping, all-inclusive concept, it is small wonder there has been such trouble sorting out its components and bringing the "whole" of it into clear focus. When we first glimpsed what "total environment" meant to our individual hides—and to the continued survival of our kind—many of us tended to over-react. Some felt that *everything* should be re-studied and re-thought from a "nature" point of view. Others, just as passionately, proclaimed that the world had outgrown its natural beginnings—that humankind had cast off its natural moorings, and only economics and technology were "real" anymore.

A decade of groping has clarified our understanding that we actually inhabit two worlds, and suggested that the most likely point of entry for understanding these two very real worlds is at the points where they interface—where human society and its technology-based economy interact with the enormously energetic natural systems of Earth.

Meanwhile, another crisis has been hammering for our attention—the energy crisis, and it would be hard to imagine a subject better suited to helping

National Park Service

Management fires provide fuel for effective energy education in parks.

us recognize and deal with the connections between our two worlds. The supply and use of energy is part and parcel of both the natural and the human-built life support mechanisms of Earth; it is also the name of the worst economic and the worst environmental problems that confront us. Much that appears to be "wrong" in both our environment and our economy is tied to the capture and/or the use of energy.

Dramatizing Interrelatedness

It is environmental education's emerging role to bring home to us the interrelatedness of all real world events—no matter in which of the "two worlds" we perceive these events to be taking place. Such education has to begin with some semblance of understanding of the laws, principles, and constraints that operate throughout both worlds. The laws that govern energy flows are perhaps the most basic of all.

Park settings are perfect stages for spotlighting the high drama of energy and environment. The storages and flows of energy through the park's natural systems furnish a beautiful model for acquainting the visitor with the syntax of all such processes—with the one-way flows of energy through temporary storages that operate on the same basic principles, whether through the world we think of as "natural" or through that natural world's latest growth—the human-built world we think of as "the economy."

Fundamental Laws of the Universe

Physics is the basic science of the universe. Its laws have been operating the longest—ever since the first atom exploded and the first combination of split atoms formed stable bonds.

Next, the world of chemistry evolved, with its own laws and principles, all of which were formulated with careful regard for the underlying laws of physics. Finally, came the world of biology, where scientists have discovered a still more complex set of principles that govern the living world. These new principles, in turn, are rooted in the laws of physics and chemistry—all of which underpin and operate throughout the biological world.

It is our present good fortune to dwell in the privileged atmosphere at the tip of the pyramid of life. Yet, only at our extreme peril, do we forget that the laws that built the base of that pyramid still operate at the top.

Take the Second Law of Thermodynamics, for example. The Second Law equation says that energy cannot be recycled, and that matter can only be recycled by expenditures of energy—always at less than 100 percent efficiency. When we ignore the Second Law of Thermodynamics, we do so to the dismay of our land and air and water. These are the components of the biosphere that must act as a blotter for the Second Law wastes we generate as we use energy.

Unfortunately, most of our economists have built their models with total disregard for the Second Law equation. The growing disarray of economics is good testimony to what happens when the basic laws of the universe are left out of our reckoning. Like gravity, the Second Law can be *violated*, but it cannot be *broken*. Only the *violator* is broken. (For economics that DO take the Second Law into consideration, see works by Kenneth Boulding, Nicholas Georgescu-Roegen, and Herman E. Daly.)

New Park Interest in Environmental Education

When we go back to the early days of environmental education in the parks, we find a history of resistance from both sides of the park gates. Many visitors frankly didn't want a "message"—they came to parks to *escape* messages, they claimed. And many park managers didn't want to be bothered with another task that would involve changing their standard "nature" or "history" interpretive approach. "Me park—you visitor. No connection."

National Park Service

The storages and flows of energy through a park's natural systems furnish a beautiful model for acquainting visitors with the syntax of all such processes.

This single use of parks was suited to a day and age when we could afford a different tool for every job. Parks were for recreation, for leisure, for "whiling away time." Nothing of concern or substance need be countenanced.

Today we can no longer afford such luxury; visitors and managers both are in a more receptive mood. With energy and material shortages pinching us on all sides, every object, item, and facility is being examined for missed opportunities, multiple uses, and liberating insights. Parks are being studied as producers of services never required of them before. These new uses no longer are a matter of choice; they are requirements, not just in the service of the general good, but in the interests of the survival of the parks themselves.

Energy: The Common EE Thread

With the same shocking impact as the photo of Earth taken from space, the interruption of our energy "habit" has hit world awareness. The limitations of our only planet confronted us 10 years ago in that first space photo; now the end of our cheap, plentiful energy supply has interrupted yet another daydream and demanded profound changes in the conduct of our daily lives.

Energy has caught the attention of everyone, striking as it does, that most sensitive of human organs—the purse. Energy has supplied park managers with both an economic and a career incentive to incorporate energy/environmental education into park practices. And energy has given interpreters the ubiquitous thread for stitching together the "real" human world of cars and cash and community, and the just-as-real world of photosynthesis and respiration and their grand, solar-powered cycles.

Yesterday you couldn't have rounded up a thimbleful of visitor interest in what energy was, where it came from, and how it can be managed. Today that same visitor public is alert and interested. Every scintilla of sunlight is now seen as a minor miracle; the "free" energies of nature take on a value and mystique that would have been impossible a mere decade ago.

The payoff points (in systems language, they're called "reward loops") have become very present and very specific so far as national parks are concerned. These points carry precise numbers—like "45," with a percentage sign after it, which means that managers must go with that much less purchased energy than usual in running the human-built systems of their parks.

These are not fuzzy, aesthetic, save-the-world exercises. They are exercises in park survival in an increasingly energy-competitive world. They concern kilowatt hours and miles per gallon and dollars, and in down-to-Earth budget terms, they are called "energy avoidance." They mean that managers must do more with less.

Why Push the Parks?

Since wise, efficient management is a total national effort, why the big push on parks? Why not let the schools, or the media, or George do it?

The answer is that few places are so superbly equipped as parks are to "ride the natural systems" and to demonstrate how these systems have designed themselves to take advantage of every step that energy takes downhill toward dispersed heat on its way through the systems. The opportunity is too apparent to be ignored; there is no longer any question.

Parks henceforth *will* be involved; they will *not* forfeit their environmental education opportunities. The edict comes from the President, from the Secretary of the Interior, from the Director of the National Park Service, from scientists and economists and ecologists—all sounding their own special notes in harmony around the same chord: Energy runs the world.

Energy Interpretation

We must make our rich fossil deposits last as long and do as much as we possibly can. Meanwhile, we must observe and learn to cherish the free natural energies of the great engines of the biosphere, hooking our own needs onto these energies wherever possible for the longest free rides, and lightening our human impact on these systems as much as possible in order to get the most satisfactory return for our efforts.

The broad generic mission of interpretation of energy within the context of the National Park Service and System is to recognize the system itself—and to interpret it as an ongoing, changing, evolving, dynamic *process* which holds lessons for *human* systems.

The people who come to the parks have an impact on the site. That impact is something to be considered as *part* of the site and included as a stellar part of energy interpretation.

Likewise, all NPS efforts to accommodate human impact on park sites are *part* of the site. When skillfully interpreted, these efforts heighten the visitor's awareness of the energy consumption attached to getting him to the site, feeding him, getting rid of his litter and other wastes, and seeing him on his way.

Maintaining a "Quivering Balance"

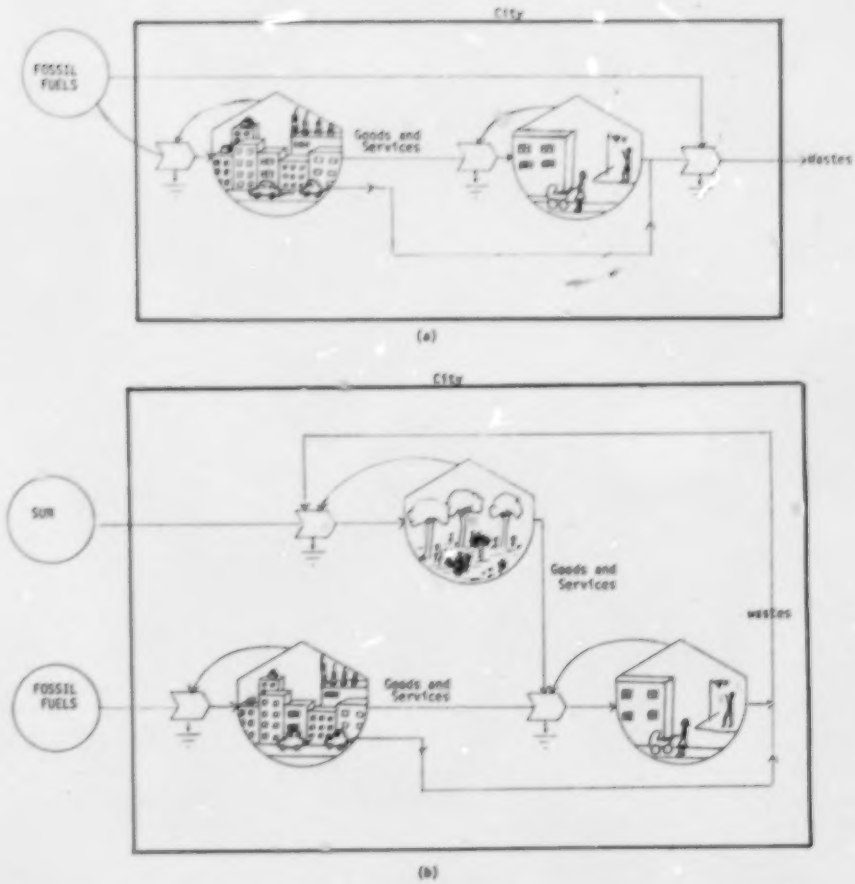
In almost all cases, the beauty of the great natural parks stems from systems that are at climax—also known as being in "steady state." In nature, these are the systems most consistently pleasing, associated with long-lived organisms, highly diverse, full of intricate energy pathways sustaining a rich variety of life.

Since human society, in the modern sense, has never achieved a condition comparable to nature's climax systems, the sudden interruption of energy for expanded growth has caused acute anxiety in human circles. The term "steady state" has been used as a synonym for "no growth" or even for "dead." It could be balm to the human spirit, troubled by such anxieties, to realize that "steady state" is full of growth in the sense of maturing and fulfilling—that it describes a system in which the energy to repair and maintain all structures is in balance with the forces of deterioration, so that everything is in what NPS Poet Laureate Freeman Tilden has called "quivering balance." A far cry indeed from the deadly end-to-growth that nay-sayers would scare us into believing!

It is park management's newest mandate to manage park sites so as to exemplify the best energetic fit of man and nature. Environmental education simply says: "Show the world what you are doing, and how."

Basic Knowledge of Physical Principles Essential

Because the physical laws that govern energy—its storages and flows—are utterly dependable (or arbitrary, which is to say the same thing but from a different point of view), knowledge of these laws is the necessary first step toward control—either control of the forces themselves or of the events and objects on which the forces act.



Fortunately, the forces and movements of energy through the natural world are well understood by ecologists. The same cannot be said of the way energy acts on and through human systems, but the laws are the same.

As the constraints of limited energy on society intensify, park visitor interest in the role of energy in natural systems will grow. Once you understand the way energy works you can shape your interpretation, your environmental education, your messages specifically to your own site—at the micro, or middle, or macro scale. You can leave it to the visitor to make the larger human connections.

Is it mountains you have to interpret? Describe the great energetic lithosphere, the slow, cyclic movements of sediments and Earth plates, of erosions here and accumulations there.

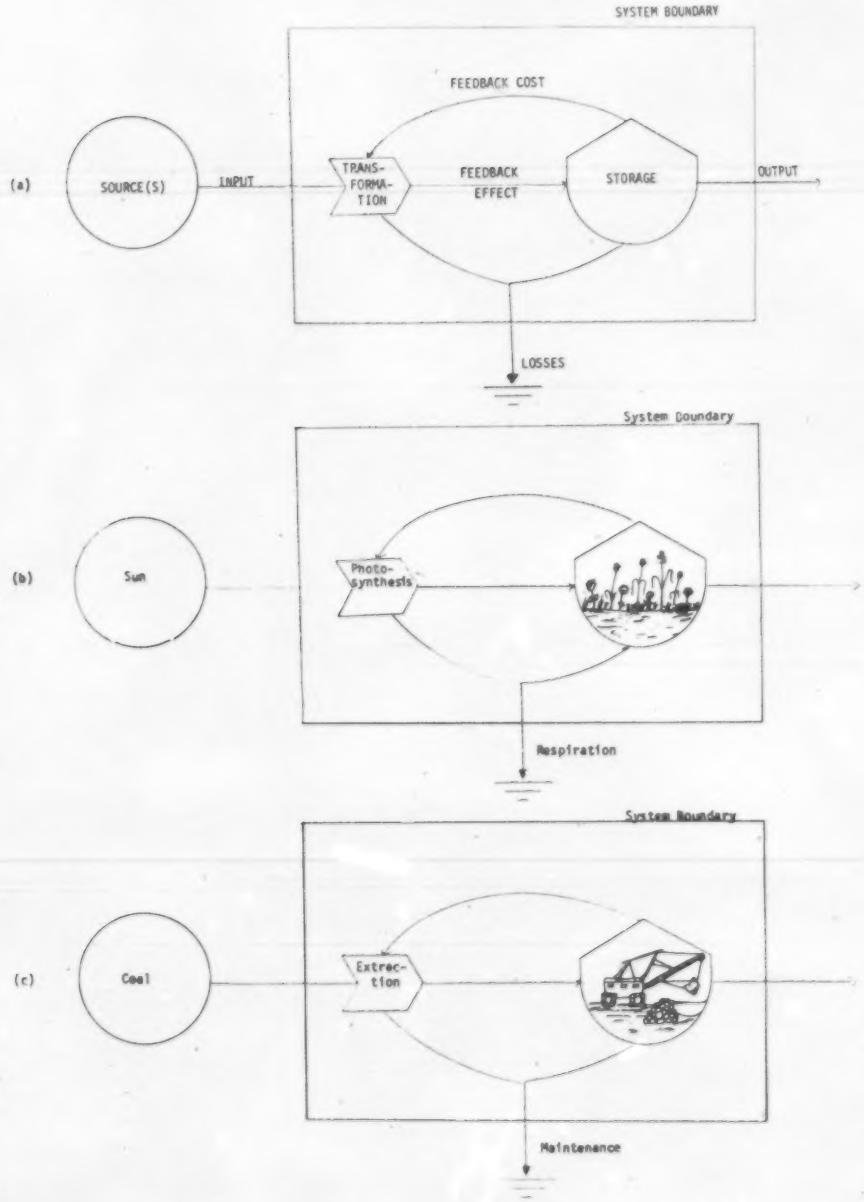
Is it an exotic plant intrusion that the park has decided to fight? What energy brought it into the park system? What energies are feeding it now? How much energy is the park buying, or diverting from nature, to eradicate it? Do the visitors have any opinions about these efforts?

Energy Systems in Urban Ecospheres

The contribution of trees and other plants to the work of maintaining city environments has been quantified by Dr. Martha Gilliland in a paper presented at the 1977 National Recreation and Park Assn. Congress in Las Vegas, entitled "Contribution of Trees to the Energy Flow Through Urban Ecosystems." Dr. Gilliland's study for the National Park Service, "General Systems Principles: A Framework for Organizing, Communicating, and Interpreting Properties of the Natural-Urban

Fig. 1. A fossil-fuel based city (top) and a solar-and-fossil fuel-based city (bottom) demonstrate how the non-human systems, such as parks represent, can pick up some of the costs of running the city by internalizing solar power and reducing the need for fossil fuel, at the same time raising the perceived quality of the urban environment.

Fig. 2. Source-storage-output module and relationships among energy flows are shown here, as the general case (a), a non-human system (b) and a human system (c). In the general case, energy from an external source is transformed and stored by the system, some of the stored energy is used (feedback cost) to "pump" in the source (feedback effect), and any excess leaves the system as output. The losses represent the energy cost of work done, as demanded by the Second Law of Thermodynamics. In the non-human system sunlight is transformed via photosynthesis and stored as biomass; output is net primary production. In the human system, coal is extracted, stored, and exported to industry.



Continuum," contains the figures shown here as 1 and 2. In the NPS study, she describes the challenge to society, facing an energy-limited future, to interface natural systems that run on solar power with urban systems that run on fossil fuels in such a way that the symbiotic relationship enhances the contributions of both to the city's vitality.

The fossil fuel-run city manufactures goods and services within the city and disposes of the wastes from technology and from people. Establishment of urban forests and parks harnesses solar energy to provide noise muffling, erosion control, aquifer recharge, space heating and cooling, wastewater treatment, air quality control, and recreation, saving fossil fuel, mitigating the exponential rise in the cost of maintaining cities, and bringing parks to people.

The Wave of the Future

As parks work out ways of relying more on their natural systems, these methods can be shared with urban planners. Energy audits can identify where the park is using significant quantities of fossil fuel; the costs and benefits of alternative strategies can be measured, and symbiotic choices made.

For example, a study might show that for every one Btu of energy invested in insulation, four Btu's are saved.

The challenge is to acquire energy-use information, to identify appropriate response strategies, to choose among them by considering their cost and effect, and to manage their implementation. Such actions are grist for the highest kind of environmental education.

From the tiniest flower petal to the mightiest Sequoia, there is an energy story to tell. And in telling it, the entire panoply of park and human can be brought into play.

Energy and parks can be as mundane as today's concessionaire housekeeping chores—as spectacular as the timeless yawn of the Grand Canyon. The same laws apply to both, and the visitor becomes a participant in the drama—not just a spectator.

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It's Not Easy . . . But It Sure Is Important!

A Look at the First and Second Laws of Thermodynamics

Few people realize it, but everything we do is effected by the First and Second Laws of Thermodynamics.

Although they can be difficult for laypersons to understand, park managers should try to include the basic principles of these Laws in their energy education programs. To increase your own understanding, let us take a look at the First and Second Laws—to see what they are and how they work.

In *Replenish the Earth*, G. Tyler Miller refers to the First and Second Laws of Thermodynamics, respectively, as (1) The Law of Conservation of Energy—or, you can't get something for nothing, and (2) The Law of Entropy—or, if you think things are mixed up now, just wait!

The First Law tells us that energy is neither created nor destroyed, only changed from one form to another. In other words, energy may be transformed, but it cannot be "lost." Thus energy flowing into a bounded system—such as your house, your park, or your Earth—equals the energy stored in the system plus the energy cast off from the system.

In the universe at large, energy in its "natural" process flows from order toward randomness or disorder. Throughout this process of flowing, energy does work for the systems it passes through. We see evidence of energy at work in light, heat, and motion. But, since energy's flow is always toward more randomness or disorder, it eventually reaches a state, called entropy, where it is too disordered to be used for further work. Any process that reverses this "natural flow" of energy toward disorder (or entropy), must be compensated for by the increase of entropy (or disorder) in an accompanying process.

Housewives and househusbands recognize this Second Law in the amount of work (energy) it costs them to keep the house clean, and in the house's "natural" ability to become disordered whenever compensating energy is not expended. Park managers and maintenance personnel deal constantly with the Second Law as they spend money and muscle power to combat the "natural" tendency of roads and buildings (and even morale) to deteriorate.

Because it always takes *more* energy to keep things in order than the energy that is tied up in that order, the fact is that one must actually *over*-compensate for the naturally degrading order of things. Hence the Second Law truism that states: "You can't win; in fact, you can't even break even." Nevertheless, it is energy that runs the only game in town.

The Second Law of Thermodynamics prohibits any spontaneous decrease in entropy (which is to say, any increase in order). It asserts that matter can only be recycled by expenditures of energy—and always at less than 100 percent efficiency, since the "power" of the energy, or its ability to "work" for systems (in this case, to recycle the matter) decreases as it continuously flows toward entropy.

The seeming paradox of living organisms does not violate the Second Law, because the sun's rays, absorbed by the green leaves of plants, provide the energy necessary for reversing entropy in the limited system of Earth we call "the biosphere." Plants run on solar energy, building up complex organic molecules which serve as the building blocks for "growing" life.

When solar radiation arrives at the Earth's surface, it is strongly "diluted" in the sense that its *prevailing wave length* still corresponds to the temperature of the sun's surface (6000 degrees Kelvin), but its *intensity* is no more than that of the radiation emitted by a room-heating radiator. Such a dilution of the radiation without a reduction of the prevailing wave length leads to what scientists call "a high entropy deficiency" (which is to say, a highly "powerful" energetic condition.) It is the inflow of this "negative entropy" that allows a plant to grow by organizing the water and carbon dioxide into more complex organic molecules.

The process of the growing of a plant, by solar energy action, is balanced by the subsequent burning of the material—whether in a "hot" fire (such as wood in a fireplace) or a "cool" fire (such as the metabolism of animals). The energy (which must be "conserved") is absorbed in the first process and liberated in the second. But in either event, entropy (energy in a state too disordered to be used for further "work" at the systems-level that produced it) must always *increase*. When this is understood, it becomes apparent that, from the point of view of plants, animals are all "parasites." (Have you thanked a plant today?)

Energy continues to do work for various systems as it "runs downhill" toward maximum disorder, or entropy. When your house finally reaches a state of such disrepair that it no longer is habitable by humans, it becomes the sustenance for dry rot, fungus, and other organisms of bio-degradation. In the process of this next "conversion" of energy to a "lower" form, the entropic cost of the process is some quantity of heat that radiates, eventually out of the biosphere and into space. At every level in its cascade toward maximum entropy, energy can support a different level of life. In the course of this process, energy is continually entering the biosphere and completing a one-way journey through it and back into space. During this journey, energy pushes the "matter" of the biosphere around in the circular paths it continuously describes through the ecosystems of Earth.

One theory of the universe holds that the random distribution of heat (thermal energy) and motion (dynamic energy) eventually will achieve the ultimate in randomness (called "maximum entropy") and at that point, the entire universe will pause and slowly begin to reverse the process of random extension, responding to its own dispersed bulk by falling back in on itself. Eventually it will achieve the condition that "big bang" theorists call "the primordial atom"—at which point the universe would re-explode and start expanding all over again.

A second theory holds that not enough matter exists in the universe to overcome the tendency to randomness and that eventually the universe will simply expand (with the random expansion of heat and motion) to some size that will accommodate every photon of energy that ever existed in a state of complete rest. The First and Second Laws will then have reached their final fulfillment in mutual demise.

On the Nature of Things And What It May Teach Us

by Thomas A. Robertson and Sandra M. Lauffer

National Park Service

"Give people a way to learn, and they may solve the problems of the rest of their lives."

There is a saying: "Give a man a fish, and you feed him for a day. Teach him how to fish and you feed him for life." This can be modified to speak to some of our present problems: "Give people an idea, and you solve the problems of their day. Give them a way to learn, and they may solve the problems of the rest of their lives."

We moderns have become good at putting names on great abstractions and then letting the many people who would use these words grope for their meaning. Environmental education is a case in point.

Many state and federal institutions deal with the "environment" and "education," displaying fine definition and tremendous confidence in their missions and processes. However, their level of success would indicate that it is appropriate for us to let the environment take care of its own definition; it's good at that.

What we *can* do is try to define that abstract term "education"—which we can describe as the process of enhancing our perception of the experiences and knowledge of our world and universe, a process that creates expanded opportunities for each individual to realize his/her full potential for satisfaction.

In other words, education is any and all processes that create a better fit of individuals with their cultural, social, ecological, and physical environment—however they find it.

A New Approach

How most of us are finding "it"—the world we live in—is complex, and growing more so each day. It is clear that we all are having a hard time keeping up with knowing all the things in our world. It could almost be a law that there are more things than we can ever know—or teach. For that reason, let us explore here a more complete and useful alternative approach to mapping the complexity of our lives.

The act of naming things in our culture has most often been a process of defining differences. Now, however, we are beginning to discover that the particular changes we are experiencing lend themselves to being better understood through the observation of similarities.

We can discover similarities in both things and functions. Seeing the similarities of *things*—parts, components, items, and nouns in general—is, of course, useful. Another learning opportunity comes from recognizing the similarities of *functions*—actions, verbs, the workings of things. Still another level of learning occurs as we integrate our knowledge of the similarities of things and the similarities of functions, and begin to deal with the general principles of what things are, what they do, how, and why.

Things

Reduced to basics, we see energy (a thing, more or less) moving matter (which is also thing-like), a process guided by information (also thing-like). All of this happens in space and time, creating new information in the changing and evolving relationships of the irreducible things: energy, matter, and information in space and time. (We may put aside but not forget gravity, which can be seen as a thing/function. As long as gravity continues to work, as it has, we have no reall, *big* problems.)

Thus we define a set of similarities shared by every thing we know. For example: Energy/matter (a rock up on a hill) is guided by information (a loss of stabilizing support, path of least resistance, and gravity) and falls, converting its energy to friction and impact as it rolls downhill. The matter of a single rock becomes distributed down the hill as pieces break and wear off, becoming energy and matter thing/parts on their own.

Functions

Again, reduced to basics, we know that things actually have few essential functions. And these are defined by a set of laws, lesser rules, and general behaviors that are universal. (Exceptions, in addition to proving the rule, make it all more interesting.)

As an example of function, everything in the universe is flowing. When something slows down, we often put a name on it—like sun, rock, cricket, man, book, or whatever. Flows which have slowed down long enough to name are

called storages. All storages are simply flows moving slowly, at different rates, through time. Thus a basic similarity in the functions of all things in our universe is that they constitute storages and flows at any one time, and probably at the same time.

Survival is another fundamental act (or function) of everything in the universe. All storages and flows can be seen as survivors. Quality of survival is a crucial component of the definition of survival for at least one reason: the higher the quality of survival, the more survival-likely is the subject under consideration.

We can see a river as a storage and flow of energy (moving from high places to low places), matter (water, nutrients, organisms, etc.), and information (water is not land or air). The river survives as a river as long as it receives water and is defined by its banks. When it no longer has water, it may be a valley. When it loses its banks, it becomes a lake or ocean.

In summary, what is important here is the ability to define the world we live in by the commonalities of things and functions. Through the understanding of similarities, we discover there are far fewer differences than we thought. What distinctions there are, merely flavor the consistency of all we know.

Domains of Survival and Evolution

Things and functions survive, change, and evolve in three domains, which are classified according to the kind of information which organizes the energy/matter flows in space and time. These domains are:

- Physical-chemical
- Ecological
- Cultural

Information in the physical-chemical domain is found in the laws and house rules of physics and chemistry. The most powerful and pervasive physical laws, of course, are the First and Second Laws of Thermodynamics. The First Law, the energy-accounting principle, states that energy is neither created nor destroyed, only changed from one form to another. The Second Law equation says that energy cannot be recycled, and that matter can only be recycled by expenditures of energy—always at less than 100 percent efficiency, since energy "naturally" flows from order toward disorder and steadily loses its ability to "work" as it flows continuously toward maximum disorder.

We also recognize powerful tendencies in the motions of gases, liquids, and solids. Chemical laws and house rules constitute the tendencies of energy/matter combinations. For example, under the same temperature, pressure, and gravitational influence, the proper combination of hydrogen and oxygen must make water.

Information in the ecological domain is found in the genetic determinants of life—the ability of an organism to store and process information for its replication and to play its roles in the systems in which it lives.

Information in the cultural domain is characterized by abstractions and symbols. To abstract is to store and process *information about information*. To symbolize is to communicate and store abstractions externally from our minds. Words spoken, stored on magnetic tape, or written on paper, are symbols.

A clarifying point: With the First Law of Thermodynamics, we can track and account for the energy flows in all actions and behaviors in the physical-chemical and ecological domains. The First Law, however, does *not* track the *meaning* in abstractions and symbols. It only tracks the physical-chemical and ecological attributes of (apparently only) humans and their tools in the cultural domain.

Put another way, the First Law insures our ability to follow and account for all the energy that went into the creation, production, and operation of, for example, a tape recorder and its tape. But the First Law cannot track or account for the *symbol meaning* that comes from patterns of sound that are produced when the recorder is played.

A final distinction held by organisms which have ability to abstract and symbolize: they (we humans, that is) have the capacity to kid themselves.

The Storage Flow and Survival Game

The Storage Flow and Survival Game is designed as a flexible, constantly evolving learning tool to help players understand the basic concepts of the nature of things as outlined above. This game is an activity designed to introduce people to the processes of perceiving the whole of things and what they do both individually and in concert.

All things in our universe constitute storages and flows.

Players draw on what they know about the *parts* of our world. Through the game, they learn to organize these parts into the working, changing *wholes* of the world around them. Similarities are seen as complements of differences, thus enhancing the appreciation of diversity in both the natural system and human society. The game's primary function is to integrate individuals, their observations, and the world and universe in which they live.

The world we live in does not have any organization which corresponds to any academic discipline. This game reflects that fact; its discipline is to enhance our understanding in a divergent manner. In other words, by this game we pay more attention to what distinguishes where we live as a whole rather than to what divides its many parts.

The game draws on the fundamental concepts of energy system analysis developed by Howard T. and Elizabeth C. Odum and described in their 1976 book,

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Energy Basis for Man and Nature. Through this game, players may learn to:

1. Relate an object to itself (i.e., its inherent qualities or thingness)
2. Relate an object to other objects (i.e., what it does)

The game should enhance our appreciation of diversity in the physical-chemical, ecological, and cultural domains. By understanding basic relationships, we can develop an understanding and appreciation of the dynamic complexities of our world. The complexity will be seen as a working, changing process about which we can learn much, much more—but not everything.

How to Play the Game

The game is played by picking any object and asking the following four questions:

1. In what domains is the object found?
2. What storages are embodied in the object?
3. What flows are associated with the object?
4. What does the object do for the system that supports it?

The domains, storages, and flows are described in terms of time, information, matter, energy, and space. Practically anyone, individually or in groups, can play the game. The level of participation is limited only by time, patience, and interest. With imagination and innovation, there are few who won't find some reward in playing.

Flexibility of the Game

The game can be played as a classroom project or as a travel game. It can even be played as a walking game.

People may talk about the game, write about it, make graphical presentations of it, or make plays and dances about it. Graphic presentations of the storages and flows may use the symbols for storages, flows, and other basic functions to illustrate interactions.

Basically, the Storage Flow and Survival Game is a cooperative exercise. If players compete in any way, it is against their individual and collective ignorance.

Players can even "compete" with the community at large. For example, they can play the game in a shopping center mall or in any kind of park or public open space. On a large blank wall, some small object of community identity can be displayed. Then all the community-associated storage and flow survival characteristics of this object can be drawn out.

The Game in Progress—An Example

The following shows how the Storage Flow and Survival Game can be played, using a piece of paper as the object under consideration.

We ask the questions: In what domains does this piece of paper exist? What are the storages and flows of the piece of paper? What does the piece of paper do for the system that supports it? Players might answer as follows—

1. First, we outline the domains of the object:
   A. Physical-chemical. The paper is made up of material with certain physical and chemical properties.
   B. Ecological. The paper (probably) comes from trees or other plants.
   C. Cultural. Paper is an abstraction we call a tool. We mostly use it as a storage medium upon which we put contrasting colors (ink) to store symbols (words).
2. Storage:
   A. Information. The paper is a place to store the symbol words put here by me with my pen. The word symbols are stored here for you to read.
   B. Matter. Paper and ink are matter. What is paper? What is ink?
   C. Energy. We can burn this paper and get some heat, maybe use it to light a fireplace, etc.
3. Flows:
   A. Information. Information flows into me, is mixed with what I already know, and comes out as the words on the paper, which may flow to you. Then you read this and the information flows into you, and so on.
   B. Matter. The "stuff" of the paper was once a part of a tree. Before that, it was a group of chemicals and sunlight. Someday, it will be combined with other matter and will flow to decomposers, etc.
   C. Energy. Sunlight, which made the 93 million-mile (1,488,000,000 km), eight-minute journey to earth, was trapped by a tree and became concentrated as cellulose. The cellulose was extracted from the tree (by the paper company) which made it into this paper. Some day, it will be combined with other chemicals and may burn—or otherwise oxidize—giving off heat (part of which will radiate back into space).
4. Survival:

   Am I satisfied with this paper? Will I buy more of this paper, and in so doing, help to perpetuate the industry flows concerned with sunlight-trapping trees, paper manufacturers, and distributors selling paper all around the world? What happens to this paper when I am through? Will future storage and flows of this paper

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How do all the bulldozers in the world compare with the rocks crumbled and earth softened by nature's daily cycles of freeze and thaw?

add to or take away from its survival? And what about me? Did this piece of paper add to my survival? And so on.

Feedback

The answer to survival forces us to question the feedback roles of our storages and flows.

The whole system of nature, which includes humanity, can be visualized as a vast gradient of many sub-systems, all interconnected in a complex, multi-dimensional fabric. As G. Tyler Miller says: "Everything is connected to everything. Intruding into, or disrupting a system in one place always has some complex, usually unpredictable, and frequently undesirable effect somewhere else." Miller reminds us of the eloquent English poet, Francis Thompson's words: "Thou canst not stir a flower without troubling a star."

Stirring flowers and troubling stars is our introduction to "feedback." Actually, it isn't our introduction at all. Feedback has been around since the beginning of everything and anything. Some of us first hear of it as "Do unto others as you would have them do unto you." Others speak of it as "When the chickens come home to roost," or simply, "You'll get yours, buddy!" Feedback is also known as "backlash" or by the esoteric term "cybernetics."

By any term, feedback is a system element which is influenced by its own past behavior. In other words, feedback is information in any form which goes back upstream to control the downstream flow of energy, matter and/or information. The behavior of systems and their components, their growth, and survival, depends upon the quality and time factors of feedback.

Energy—A Special Note

Energy flows operate and define the system of nature and human society. For example, consider sun energy flowing into leaves, being trapped as plant matter. The plants are consumed by animals, and the wastes of this consumption are recycled to become food for more plants.

We can discover the same flows in human society. Fossil fuel energy (from natural systems long ago) is changed into electricity which runs a city. Industries in the city (like a paper company) use (consume) this energy to make products (paper) which are used by others (more consumers). After we are finished using the product, it is "thrown away." However, there is no "away." Everything gets recycled, sometimes by us humans, most often, by nature. Pollution may be seen as stuff that doesn't get recycled fast enough.

In the mid-1800s, as the industrial world was just discovering its use of power, Ralph Waldo Emerson said: "Only as far as the masters of the world have called in nature to their aid, can they reach their height of magnificence. This is the meaning of their hanging gardens, villas, garden-houses, islands, parks, and preserves, to back their faulty personalities with these strong accessories."

In the late 1930s, ecologist Donald Culross Peattie was saying: "The orator who knows the way to the country's salvation and does not know that the breath of life he draws was blown into his nostrils by green leaves, had better spare his breath. And before anyone builds a new state upon the industrial proletariat, he will be wisely cautioned to discover that the source of all wealth is the peasantry of grass."

In between Emerson and Peattie, and ever since, we have been caught up in the cleverness of our machines and institutions—with little time for such exhortations.

Yet how do all the bulldozers in the world compare with rocks crumbled and earth softened by the daily cycles (particularly in the spring) of freeze and thaw as this planet rotates its natural surface in the sun's radiation? What institution has the persistence of a dandelion?

We have become a jaded and skeptical people, caught in the whim of politics and "public relations," of fashion and gossip. Our personal and social truths are elusive. In contrast, while there may be debatable "truth" in the freezing point of water, wherever it is found, and in the ecological niche-filling of a dandelion, whatever its purpose, we can be sure that in these lessons of nature there is no intent to deceive.

The point is this. We humans have never been better prepared or more in need of the lessons that nature can give us by her example.

Thomas A. Robertson is an energy systems consultant in Washington DC. Sandra M. Lauffer is the editor of Future Abstracts. *The authors accept the responsibility for the ideas contained in this article and appreciate the contribution made in the early stages of this work by Alicia V. Quinlan and Ane D. Merriam.*

Values and Environmental Education

by Audrey Dixon

We all know what we like—in foods, sports, clothing styles, personality types—or, at least, which we prefer when we can't fully endorse any among the choices given us, as is sometimes the case (e.g., deciding which political candidates to back).

But, if asked to explain the basis for our choices—including the ways we act—all too often we don't have a ready reply.

It is not always necessary to know the "why," of course; the kind of standard answer, "Well, because that's the kind of animal I am," often will suffice. We seem intuitively to understand that our total *system* of valuing is complicated and confusing. Yet, at one time or another, most of us find ourselves heatedly, perhaps even irrationally, defending the valuing side of our selves.

Subjective, Complicated, and Little Understood

According to one definition *(The Random House Dictionary of the English Language)*, a value judgment is "an estimate, usually subjective, of the worth, quality, goodness, evil, etc. of something or someone." As the "worth" of anything must be assessed in terms of some standard of exchange, such as money, a value judgment compares the worth of one thing with the worth of another.

One musician might estimate that the music of Johann S. Bach is much greater than the music of Irving Berlin, coming to his conclusion on the basis of the complexity, inherent beauty, and overwhelming intellectual power in evidence in the Baroque master's works. Another musician, however, making his judgment on the basis of the number of copies sold in relationship to population numbers, or even the percentage of people capable of enjoying the music, might come to the opposite conclusion.

Similarly, those who oppose and those who favor abortion might be expressing their disagreement on the value of the human "rights" each cherishes most—human life and a woman's control of her own body.

Further complicating the matter of values is the fact that two persons who *agree* on an issue may have arrived at their positions based on very different values. For example, two women who agree that they favor abortion as a legal possibility for women, may actually be expressing their valuing, respectively, of population control and a woman's right to not have a baby she does not want at the time.

Within each of us, a number of value judgments relating to a series of important human conflicts are strung together, like links in a bracelet, into a whole value "system." These systems vary tremendously among us as they are influenced by time (including our age), place (including geography and climate), and circumstances (from the personal to the international). They may be quite similar or quite different across societies and economic classes.

As stated earlier, value systems *are* complicated. Maybe this is one reason why we humans have waited so long to attempt to understand the origins of our value systems . . . from which of our earliest experiences and through what processes our most elemental attitudes are formed . . . how values grow out of these basic attitudes . . . and how these values become organized into ethical systems.

Task Force Established

Several months ago, the Subcommittee on Environmental Education of the Federal Interagency Committee on Education decided that it wanted to know something about values and value systems as these might pertain to environmental education. The Task Force on Values and Environmental Education was put together to deal with the topic.

As chairperson of this five-member task force, I have been encouraged by the vital concern for the subject on the part of the group's members, and think that other people involved in environmental education might be interested in knowing about our modest beginnings.

Believing that we urgently need to understand individual value judgments and value systems that lead to societal ethical systems, in order to understand the dynamics of survival and evolution growing out of positive adaptation to the limiting realities of life, this task force has set forth the following "First Statement," its accompanying brief set of assumptions, and outline of subjects to be investigated first.

- *"First Statement"*

  Attitudes, values, and ethics, taken together, constitute a hierarchical system which operates within all persons, determining how individuals and groups perceive, make decisions (including the determination of goals), and conduct themselves. These three levels of basic (and, therefore, highly influential) mental sets predispose all peoples' actions, relating to the side of the coin we might call "responsibility" in contrast to the side we call "knowledge."

  Not yet well understood by the general population, attitudes, values, and ethics need special study so *their* best use—along with that of the amoral, (so-called) factual fund of information available in science and technology—can be made (1) to prevent and remedy inharmonious human activities with other human and ecosystem processes, and (2) to initiate just and creative human activities for interacting with other humans, living organisms other than humans, ecosystem processes, and built environments.

- The *assumptions* on which the Task Force on Values and Environmental Education will base its work are the following:

1. At this point in time and for the foreseeable future, men and women must depend upon products of this planet's natural systems to continue life maintenance of their species as well as that of many other species.
2. Philosophically, there is an ever-transcent possibility of responsibility as a concept that may be worked out in the world.
3. Responsibility is bound to the existence of men and women and, when acted upon, becomes the social force that binds individuals in their group efforts to survive.
4. There is a dimension of *future* in responsibility as well as of *present*.

- The *topics* the group members will study first are:

1. *Approaches to attitudes/values studies* useful to environmental education.
   a. *Values clarification approach* (identifying various value positions).
   b. *Values inquiry approach* (an analytical approach based on observation and description through hypothesizing).
      (1) Basic assumptions found in today's cultures which seem to retard an optimal (perhaps, even a merely adequate) functioning of the planet.
      (2) Identification of important, prevalent American myths.
   c. *Moral reasoning approach* (a typology dealing with levels of human moral growth).
   d. . . . others . . .
2. *Fundamental types of values that typically give rise to basic conflict.*
3. *Changing values as they relate to energy availability.*
   a. Historical precedents.
   b. Present examples.
   c. Predictive values of a. and b. immediately above.

The Task Force on Values and Environmental Education is open to comments and suggestions from any quarter as it feels this exploration into people's basic needs, flexible natures, and creative impulses as evidenced in their attitudes and values, leaves room for pluralistic value systems that are compatible with survival on our planet.

Audrey L. Dixon is with the Division of Interpretation and Visitor Services of the National Park Service. She represents the National Park Service on the Federal Interagency Committee on Education's Subcommittee on Environmental Education.

Who You Can Turn To

FEDERAL

There are many organizations active in the area of energy/environmental education. The following list includes major groups actively interested in energy/environmental education. Some offer a broad series of publications; others offer technical assistance.

Bureau of Land Management
Department of the Interior
18th & C Streets, NW
Washington, DC 20240

Chesapeake Bay Center for Environmental Studies
Smithsonian Institution
Route 4, Box 622
Edgewater, Maryland 21037

Department of Energy
Washington, DC 20545

Energy & Education Action Center
400 Maryland Avenue, SW
Washington, DC 20202

Energy Research & Development Administration
Technical Information Center
Box 62
Oak Ridge, Tennessee 37830

Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Fish and Wildlife Service
Department of the Interior
18th & C Streets, NW
Washington, DC 20240

Forest Service
Department of Agriculture
12th Street & Independence Ave., NW
Washington, DC 20250

Heritage Conservation & Recreation Service
Department of the Interior
18th & C Streets, NW
Washington, DC 20240

National Aeronautics & Space Administration
Educational Programs
Washington, DC 20546

National Park Service
Department of the Interior
18th & C Streets, NW
Washington, DC 20240

National Science Foundation
1800 G Street, NW
Washington, DC 20550

For maximum impact, a park's energy and resource management policies should be fully explained to visitors.

Office of Environmental Education
Office of Education
Department of Health, Education & Welfare
400 Maryland Avenue, SW
Washington, DC 20202

Office of Environmental Quality
Department of Housing and Urban Development
7th & D Streets, SW
Washington, DC 20410

Office of Population Affairs
Office of the Assistant Secretary for Health
Department of Health, Education & Welfare
Washington, DC 20201

Soil Conservation Service
Department of Agriculture
Independence Avenue between 12th & 14th Streets, NW
Washington, DC 20250

Tennessee Valley Authority
Division of Forestry, Fisheries & Wildlife Development
Norris, Tennessee 37828

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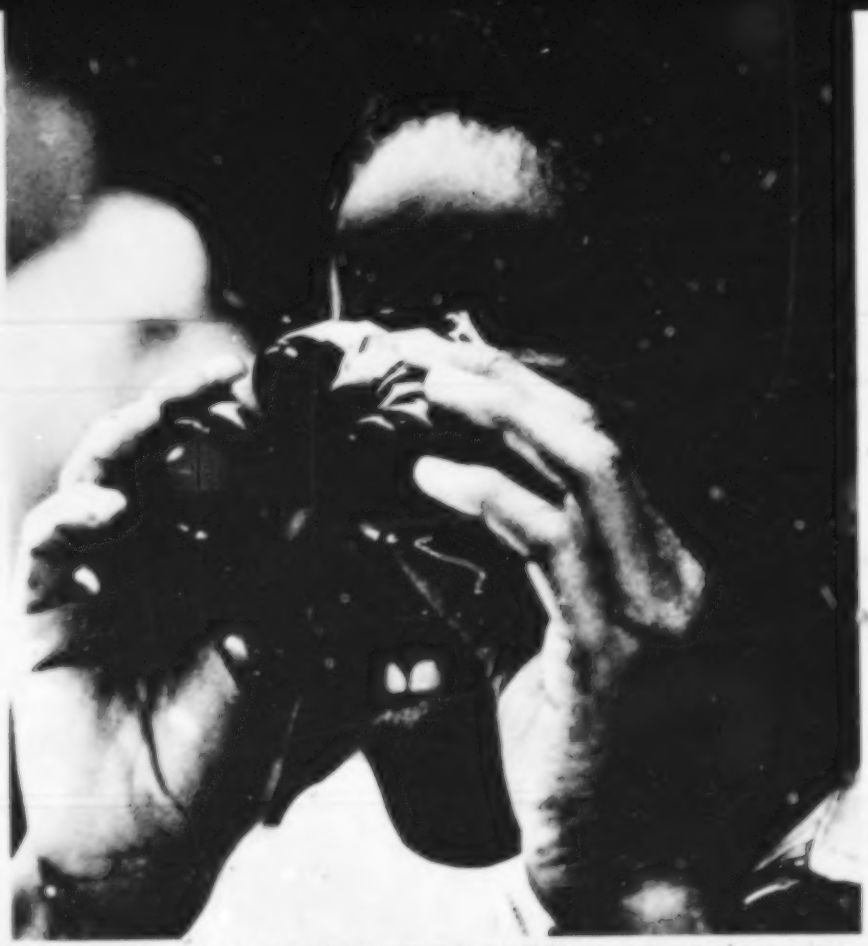

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In declaring 1979 the Year of the Visitor, the National Park Service will place new priority on its role as an environmental educator.

PRIVATE

The following private organizations provide information or technical assistance to communities, organizations, and individuals interested in energy/environmental education oriented projects and programs.

Acclimatization Experiences Institute
Box 841
Lake Geneva, Wisconsin 53147

Alliance for Environmental Education
Massachusetts Audubon Society
Southgate Road
Lincoln, Massachusetts 01773

American Forestry Association
1319-18th Street, NW
Washington, DC 20036

Association of Interpretive Naturalists
6700 Needwood Road
Derwood, Maryland 20855

Conservation Education Association
University of Wisconsin—Green Bay
Green Bay, Wisconsin 54302

Conservation Foundation
1717 Massachusetts Avenue, NW
Washington, DC 20036

Energy and Man's Environment
0224 SW Hamilton, Suite 301
Portland, Oregon 97201

Garden Club of America
598 Madison Avenue
New York, New York 10022

Izaak Walton League of America
1800 N. Kent Street
Arlington, Virginia 22209

Minnesota Environmental Sciences Foundation, Inc.
5400 Glenwood Avenue
Golden Valley, Minnesota 55427

National Association for Environmental Education
P.O. Box 560931
Miami, Florida 33156

National Audubon Society
1130-5th Avenue
New York, New York 10028

National Wildlife Federation
1412-16th Street, NW
Washington, DC 20036

Pocono Environmental Education Center
R.D. 1, Box 268
Dingman's Ferry, Pennsylvania 18328

State Environmental Education Coordinators Association
c/o Minnesota State Department of Education
644 Capitol Square Building
St. Paul, Minnesota 55101

Thorne Ecological Foundation
1229 University Boulevard
Boulder, Colorado 80302

Wilderness Society
729-15th Street, NW
Washington, DC 20005

Yosemite Institute
P.O. Box 487
Yosemite, California 95389

STATE

At the state level, the most important individual to contact for *information, advice and assistance* is your local state coordinator for environmental education. Write to "Environmental Education Coordinator, State Department of Education," in your state capital.

National Park Service

Parks must explore alternate energy sources, and interpret their potential to the public.

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